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THE TRANSVAAL WAR: ITS LESSONS IN REGARD TO MILITARISM AND ARMY RE-ORGANISATION.

(*Concluded.*)

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Russian Councillor of State, author of "The War of the Future."

Monday, 1st July, 1901.

Major-General Sir J. F. MAURICE, K.C.B., R.A., *p.s.c.* (Commanding the Woolwich District), in the Chair.

PART II.

THE effective of the land troops who have passed through the ranks for a greater or less period and who can be summoned to the flag among the Great Powers increased from 6,000,000 or 7,000,000 in 1877 to 15,500,000 in 1897.[1]

The maximum number of troops who could be called out, after making deductions for garrisons and internal services, based on the calculations of military authorities, are :—

	1877.	*1897.*
[1] Russia	1,700,000	4,000,000
France	1,750,000	3,500,000
Germany	1,300,000	3,400,000
Austria	1,137,000	2,600,000
Italy	867,000	2,000,000
	6,754,000	15,500,000

Germany	2,550,000
Austria-Hungary	1,304,000
Italy	1,281,000
	5,135,000
France	2,554,000
Russia	2,800,000
	5,354,000

With the 5,135,000 soldiers of the Triplice, and France and Russia's 5,354,000, what importance could a British addition of several army corps have?

It is probable that the neutrality of Belgium and Switzerland would be respected. There can be no doubt that the operations between France and Italy will have only a secondary importance, and on both sides there would result merely a state of expectation as to what was happening on the principal theatres of war.

The first question which presents itself is, Who will attack? And the reply must be that at the beginning of the war neither France nor Russia can take the offensive by invading Germany: France, by reason of her political and social organisation; Russia owing to her great distances. But there are other reasons more important why neither France nor Russia can think of invading Germany.

Invincible while on the defensive, and, therefore, sure that their adversaries would in the end be forced to demand peace, on the offensive they would exhaust themselves without having the slightest chance of imposing their will on Germany. The principal object of all wars in the past was the destruction of the enemy's army by striking against it some decisive blow. But even by cases taken from these past wars I pointed out in my work "The War of the Future" that it is impossible nowadays to obtain such result by taking the offensive.

Since 1870 France has done everything to prepare herself for the defensive, and Russia since 1880, and they will not suddenly abandon this attitude for the adventure of an attack, believing that Germany would soon be obliged to cease the war for social and economic reasons.

General von der Goltz himself said "France is so well prepared for a war, the frontier regions are so strongly fortified, that we should not recognise our ancient enemies of 1870." The operations between France and Germany are likely to be so prolonged that on looking at a map it will be impossible to discern their progress; and Russia by reason of her immense extent, and relative lack of communications, presents enormous difficulties for the attack. A war with Russia in no case could end with one campaign; several would be necessary to arrive at any result.

Now such being the case, Germany would be obliged to demand peace owing to influences destructive to the social and economic order, which would operate in case of an offensive war with an intensity infinitely greater than in France acting on the defensive.

Having established primarily this fact that France will rest on the defensive, I will give some statistics for a plan of operation. Basing my work on the calculations of General Brialmont, I estimate that the forces put into the field by the two adversaries will be about 2,128,000 French against 2,035,000 Germans. In estimating the question of loss, fearing to be accused of exaggeration, I have computed the losses of the attacker as only 20 per cent. of his effective. Having made the deductions, and the other necessary deductions from disease and desertion, it appears that the French army standing on the defensive would still dispose of 1,160,000 men to defend Paris, whereas the Germans would have only 520,000 men left to proceed to the siege.

Count Caprivi, who was familiar with all these questions, expressed himself as follows when speaking in Parliament on the subject of the new military law:—"If the French army is beaten and takes refuge in its fortresses, we should need to invest Paris completely 18 army corps (nearly 900,000 men), without counting the reserve. It is probable that the investment would take place only on one front, and in that case the siege might last a whole year, as did the siege of Sevastopol." In the Austro-German-Russian theatre of war a great number of combinations might be formed, but an examination of them all would lead to the same conclusion, that in presence of the technical conditions of a future war no decisive result will be attained.

For reasons like these decisive war between the Triple and Dual Alliances indeed seems to me an Utopia, and the application of the lessons of the South African War to a Franco-German War proves that what was yesterday only a probability has become an impossibility, as the forces put into the field by the two adversaries will be almost equal, that is, 2,128,000 French against 2,035,000 Germans.

The outbreak of operations has generally in the past been preceded by a declaration of war. It is very doubtful whether in the future we shall have such a declaration. But the South African War teaches us that it is a mistake to believe that nowadays the effecting of the most rapid mobilisation will play a decisive rôle. To oppose the enemy the inferior numbers of attacked troops will throw up entrenchments at the moment of mobilisation. And the most notable thing about the South African War—as Sir Howard Vincent told you in his lecture delivered here a year ago—is the speed with which entrenchments may be made. In the evening we see an entirely bare hill, and by morning we find three lines of trenches preventing all approach. There can be no doubt that skilled European troops will be more capable at such work than the Boers. The first lesson of the Transvaal War is, that with modern arms a position can be defended by a very thin line of riflemen.

My belief is that France being able to repulse all German attacks, and not wishing to risk an attack herself, will abandon the idea of invading Germany, and will not even make counter-attacks.

If I were to develop more fully this part of my lecture, I should say that all that is applicable to the defence of France is applicable to England, who, acting in the same way, could guarantee herself against

possible invasion by means of territorial troops with an insignificant reserve of regulars. The preliminaries of a French resistance on such lines are simple.

The French positions would be strengthened by field fortifications. The time of peace has been utilised to prepare plans of works, entrenchments, batteries, wire entanglements; and there will be collected in the immediate neighbourhood sufficient trenching tools and other necessaries. On the declaration of war, the civil population of the frontier region might be formed into groups like the Boers, and be charged with the construction of works under the direction of engineers, and under the protection of the frontier garrison. Even if the Germans succeeded in piercing this line at any point by accident they would only come across a second line as strong as the first, before this they would find themselves in danger of having their flanks turned. It is, of course, not enough to construct defences: it is necessary also to man them. France possesses forces of more than 4,500,000 men who have undergone military training, and, in view of the lessons of South Africa, she might for the defence of her entrenchments and fortifications appeal to the frontier forces and the population of the limitrope provinces. These contingents would be ready before the German mobilisation, however rapid it might be. They would need only a simple uniform, such as khâki, and sufficient rifles and ammunition.

Behind the lines of defences defended by territorials the mobilisation of the Active Army would proceed as now arranged. As the French army will rest upon the defensive, it has no need to receive its reservists before being transported to the frontier. It will receive them as easily on the land which it defends, and thus the first part of the concentration will be much simplified.

The South African War has proved perfectly the argument as to the power of thin lines armed with modern weapons. Very thin lines of the Boer defence with an inferior total, with training infinitely inferior to that of the French, and without organisation, succeeded in repulsing the British. At Waterloo, Wellington had some 35,000 men on each mile of ground. At Magersfontein, the Boers with some 6,000 men defended 20 miles of front. That is to say, they found 300 men per mile sufficient to hold their lines against the British attack. Their defences were 100 times thinner than the Waterloo lines. It is impossible to attribute this to any exceptional courage on the part of the Boers. The French have often proved no lack of courage; they will have 6,000 men per mile, not 300. But the guns of the defenders when turned, as at Spion Kop, on exposed men in close formation were very deadly.

And what is still more important is that the French land is on the whole more propitious for defence than South Africa is in general. The French country in this respect is highly favourable for defence, as may easily be seen from the profiles of the roads from the German frontier to Paris.

In discussions with soldiers I have always met with the objection that the Germans would employ such masses of men that the lessons of

the Transvaal War would have no importance. Many men, they say, would be lost, but the defenders' lines would be broken all the same. It is necessary to observe that the military authorities whom I have already cited declare that the greater the masses the greater will be the defeat. The German troops must be so dispersed to such immense distances that the same phenomena will be witnessed as in South Africa. The military routinists deny this necessity, but it exists. Three British generals who have followed the events of the present war have occupied themselves with it. General Webber is one. General Maurice has treated the subject in the same way at your Institution when he said:—"Wellington at Waterloo had 69,000 men on 2 miles of ground. During the 1870 campaign somewhere about 5,000 men were quite ample to hold any mile of ground. Obviously, if that proportion is carried on as the weapons improve in rate, range, and severity of fire, a very much smaller body of men will be able, with our modern weapons, to resist a frontal attack. It was the deduction we all made on previous experience, that that would be the case, that a frontal attack against men armed with the weapons of to-day is, as Bloch has worked out in his book in a most exhaustive manner, one of the most difficult of attempts."

And Lord Roberts, as I have already pointed out, declared that he had increased the space between the files to 20 paces.

The Austrian regulations for attack assign to a regiment 800 to 1,000 paces. Thus on a space in which Lord Roberts thought he could put 166 men, and afterwards found it possible to put only 50 men, we see a whole regiment put. But who can doubt that Lord Roberts was right? But if against the thinly-manned Boer trenches such dispersion was necessary, how can a European army attack in such close formation the thicker-manned trenches of a European detender?

But is the massing of an army corps on a space of 5 kilometres possible? Supposing an affirmative reply; where will an open battle-field be found large enough for armies consisting of 10 or 20 army corps? Wherever the attacker might find such a field we do not know, for thirty years' work has been going on to prevent it. But the solution of all these problems is, that even in Germany itself soldiers recognise that it is quite impossible to mass troops according to the regulations. Authorities even declare that the troops must be so dispersed that General Schlichting even went so far as to say that the headquarters staff of the German armies in any future war, on either frontier, had best remain in Berlin.

But there is still another argument employed by professional soldiers, who treat the subject superficially, and from the point of view of routine.

If direct attack is impossible, the attacker, we are told, will employ turning movements, such as were employed by the Germans in 1870, and by Lord Roberts in South Africa. But the first condition of such operations is a numerical superiority which the Germans will not possess; and the second condition is exposed flanks, and we know that natural obstacles and extensive fortifications protect all the French lines of defence.

A French attack upon Germany would meet with the same results, even supposing that France, owing to any accidental conditions, should mobilise more rapidly. And all that is applicable to the Franco-German frontier is more or less applicable to the Russo-German, Austro-Russian, and Franco-Italian frontiers: no side would even at first have a great advantage in numbers, and in a few days the combatants would be equal in number and armament.

Guerilla Warfare and the Lesson of South Africa.

But in war we must always count with the unforeseen, however improbable; and though I believe that it is unlikely that a German attack upon France would succeed, still it is worth while considering that eventuality; and supposing that France does not recover from her first defeats, what would happen then? The first thing to note is that the spirit of nationality is much stronger to-day than it ever was, and no nation will submit to national annihilation without first exhausting every means of defence. Therefore we must consider the contingency of the struggle continuing long after the first opposition was defeated. But guerilla warfare under modern conditions would not be without order and method, but on the contrary would be scientific, with magazine rifles and smokeless powder, and would take place under conditions yet unknown.

Taking as objective the railways, which are so much more vulnerable than ordinary roads, the French guerillas would probably destroy the Germans. It will be replied of course that the French civil population is very different in character from the Boers. Now this is no doubt true; but, on the other hand, every Frenchman has undergone military training; and whereas the British Army in South Africa outnumbers the whole civilian population, men, women, and children, the German armies would be confronted with a civilian population numbering millions. The fact that the French franc-tireurs effected so little against the Germans in 1871 proves nothing.

The contention which I urged long before the South African War was that the modern rifle, favouring individual action and sharpshooting, and requiring the abandonment of close formations, was primarily a guerilla weapon and tended to put the civilian on a level with the regular. The Transvaal War, especially in its later stages, has abundantly confirmed this prediction, and we see now civilians in inferior numbers actually attacking regulars and gaining successes.

Is it not certain that if the French were able to carry out an invasion of Germany they would meet with similar difficulties. A guerilla war would inevitably follow the regular resistance in the future.

The question then arises, whether there is really any need for the training of men as it is practised nowadays. It seems to me that the answer is in the negative, and the South African War is the best proof of this. But since England is on the point of re-organising her Army, we must examine in still greater detail this question, considering it from the point of view of the part which England might take in a Continental war.

The British Army and the Lesson of South Africa.

Just as Plevna was a revelation from the point of view of the use of entrenchments, the South African War has been a revelation from another point of view, showing not only the superiority of the defensive, but also the enormous increment of strength given to a civil population's resisting power by smokeless powder and the modern rifle.

This revelation as to the consequences of a national war has an immense importance. It shows how invincible is a nation defending its independence. In a war between Great Powers, as I have attempted to prove, there is no prospect either of great victories or of definite gains by means of arms. We shall see only a reciprocal using up of forces. But this wear will be infinitely greater among the attackers than among the defenders; and thus from the economic as well as the military point of view the defender is infinitely stronger. Soldiers themselves tell us that the basis of the armed force of a country is no longer the army, but the economic resources, and everything which weakens these resources weakens the base upon which the army rests. But the deduction from a fact which they admit is ignored to an extraordinary extent by soldiers themselves. For at present the productive economic forces of nations are enfeebled and milliards spent in order to give to armies a training which no longer corresponds to the conditions of war.

It seems to me that the manœuvre formations which are still taught are no longer applicable to real battle. Formerly there was every reason for making the soldier first of all an automaton, which by force of exercise had to perform mechanically the various evolutions on the word of command, unconscious of everything except that he did what his comrades were doing. Thus, in drill as at war, powerful masses moved by the inertia of their own obedience. These masses were deprived of all individuality, and became veritable mechanical automata, obeying the voice of their commander like animals. To obtain this result innumerable regulations are elaborated. But they have not progressed commensurately with the technical improvements in arms. The soldier is still a machine, and the South African War has proved that the transformation of the soldier into a machine, moving at the single command of its chief, is now useless and even injurious. For movements in close formation are now carried out only at a distance from the enemy, and during march. With the enemy in sight, close formations are not admissible, for they would result in losses which no army could sustain. Lord Roberts from his own experience recognised this. Therefore the power which the mass formerly exercised upon the individual has disappeared. The habits acquired during training are no longer applicable, and their place has been taken by the individual qualities of the soldier. The barrack manikin has been of late shown to be inferior to the simple practical man who brings to the main idea—the location of the invisible enemy and his defeat—all his energy and intelligence.

The military service of to-day disorganises the family, and is a cause of enfeeblement for nations in the struggle for existence, by taking away

several of the best years of men's lives. And with what object? To obtain victories in imaginary battles fought in the old method, which will never take place.

Even in the question of fire instruction we do not find any especial advantage in the present system of training. *In actual battle* the difference between picked marksmen and very ordinary marksmen seems to be almost nil. Emotion and fatigue have the effect of levelling all down, and all experience shows that it is the great number of shots fired during the short time in which the enemy is visible which produces the result. The modern rifle can fire as many shots as twenty-five a minute, and in a modern European war the defenders will be much better supplied with cartridges than, for instance, the defenders of Plevna, who belonged to a resourceless State like Turkey. Yet at Plevna some attacking regiments lost 60 per cent.

It is difficult, indeed, to see any advantage in compulsory service. Suppose that compulsory military service had been adopted in England, and that 300,000 Reserves had been sent to South Africa, you would not have had better men; and as things are now you have had the advantage that amongst those you have sent there are no heads of families, no merchants, no labourers—the indispensable levers of social activity. Public credit has rested intact; but if you had sent to South Africa the mainsprings of English social life, what perturbations there would have been! And, indeed, of what is the boasted German Army instruction composed? First of all, marching on the drill ground with the legs stretched out, the body held stiffly, strictly observed manual exercise, which regards it as a *sine quâ non* that all the rifle barrels slope evenly on the shoulder, while every disengaged hand in the company or battalion swings in time. It would be interesting to know what value all this would have been to your armies in South Africa.

Of course, the first of all questions which is concerned in that of British military service is, What is the purpose for which the British Army is intended? Is it to take part in a Continental war? But with France and Germany's two millions of men and with Russia's four or five millions, what rôle could England play with an army of four, five, or even ten army corps?

Is it for defence against an invasion that England wishes to create the Army projected in the present scheme? But England has already means of defence so effective that there can be no thought of invasion. It is the British fleet which is the best guarantee. Is it then for Colonial purposes this great Army is required? If so, the German system is still unsuitable, and involves only social perturbations such as I have described. In Germany the Army is organised largely from the point of view of the propertied and governing classes. "You must kill your fathers and mothers if necessary. You have taken the oath," says the German Emperor. There is no need for such an Army in England, because at present there is no obligatory service in England, and the social discontent which makes conscription necessary does not exist.

What England has really to fear is the interruption of maritime communications in time of war. I have already pointed out the immense importance which economic resources will play in the future war. The interruption of maritime communications would be very grave even for France. As to Germany, Admiral Werner estimated that in case of war with Russia she would have to demand peace after a few weeks if the struggle were to begin at the period of the year when the stores of grain reach their depletion; or after a few months if the enemy's ships were able to prevent the transport of oversea grain. At present the Powers prepare to do all they can to paralyse the trade of a possible enemy, and carry on privateer war without mercy. The best evidence of this is the subsidies played for merchant-ships which can be turned if needed into commerce-destroyers.

The employment of war-ships to convoy merchant-vessels presents enormous difficulties, and would not prevent insurance rates rising so high as to affect the price of food. The protection of the commercial routes by squadrons at strategical points is impracticable, owing to the enormous number of ships required. England, it has been estimated, would require 556 cruisers for this purpose. Some British admirals have been of opinion that the British fleet would be unable to protect its merchant-ships in time of war. But even if a high degree of protection could be ensured, the price of products of the first necessity must rise to enormous heights so that they would be beyond the reach of the mass of the population. At her own manœuvres England herself has proved that a well-handled fleet of swift cruisers could bring her to the edge of ruin without risking a battle.

The statistics of production and consumption show that the deficit of wheat increases every year. In later years it appears that England imports wheat for 323 days of the year, barley for 263 days, oats for 40 days, and enormous quantities of other foods. In this respect we see a terrifying progress towards need.

England is indeed then greatly interested in the maintenance of peace from this point of view alone. And we must not forget that we live in an epoch of which the essential motto is "Envy." This envy is turned towards the British Colonial possessions. The Colonial mania has touched spheres which ought to be beyond such a danger. But England on her side does not covet the Colonies now possessed by other nations, and therefore she has nothing to gain and much to lose by war. I must repeat, then, what I wrote a year ago in the French *Revue des Revues* in an article on the Transvaal War and its Problems:—"England must return to the glorious liberal traditions of the past which made her great, otherwise she will be in the position of staking her existence for the sake of a chimera."

Conclusion.

In my lectures I have attempted to study the lessons of the South African War from the point of view of a great European struggle. I have pointed out everything that is possible will be done on the Continent in

order to hide the truth and distort it. The best evidence of this is the Hague Conference. In spite of the affirmation of soldiers, among them men of great intellect, who had taken note of all the changes which have come about in the military art, men who had the great merit of revealing their convictions as to the probable duration and effects of a future war; in spite also of the high authority some of these men enjoy from their positions, yet their predictions as to what would happen, which the South African War has so thoroughly confirmed, produced no effect. The discussion did not even touch any essential point.

It was because these declarations had been neglected that the proposal of the Russian Emperor made to the Hague Conference that peace should not depend upon a single will alone, but upon an arbitral tribunal, had no success. But to-day, after the revelations of the South African War, we see how generous and just was the initiative taken by the Sovereign of a Power which alone represents two-fifths of the total forces of Europe. The object of the Hague Conference not having been attained, it is, unfortunately, to be feared that a war may break out in Europe. National hatred and envy are stronger than ever. For England the danger which results from this situation is all the greater, because in order to justify the immense expenditure which is made on fleets, one puts forward the pretext of the defence of commercial interests, which it is pretended are menaced by England. But neither reform of the Army nor increase of the Fleet will diminish the danger.

In conclusion, I will add only a few words for the pessimists who think that the present state cannot be changed. If the conviction was established that all hope of profitable invasion which would satisfy covetousness—the cause of war—had became illusory, the words of the Tsar's rescript that "the competition in armaments is unjust and absurd" would receive a brilliant confirmation.

Formerly there were no means of constraint but force; to-day if there existed an arbitral tribunal whose judgments could be carried out by excluding a recalcitrant from the benefit of the international conventions, war would become impossible. That is the reason why armaments form a crime against humanity. The greatest service, therefore, that can be rendered to humanity is to study profoundly the new conditions of war and the results to be hoped therefrom. When all are convinced of the impossibility of deciding international quarrels by means of war, disarmament will be imposed gradually by the force of things. And then when the greater number of those millions of men who now for years are engaged only in sterile military exercises; when a great part of the hundreds of millions spent to-day for keeping them are devoted to aiding the misery of the people; when there is no more need of Colonial conquests or of Protectionist economics, England will profit from the new state of things more than any other country, and a grateful humanity will bless those who have contributed to this result.

Colonel C. M. H. DOWNING, C.M.G., R.A. :—I have very little to say, except that from my experience of South Africa, I consider that the artillery in the attack still have the same *rôle* to play as ever, namely, to support the infantry attack; and the only

way to do that is by keeping down the fire of the defenders, though without necessarily inflicting actual loss thereby. That has been shown on several occasions, especially, I think, at Pieters Hill. There I had no personal experience myself, but I can easily imagine from the experience I *have* gained that there is no difficulty whatever in artillery, properly used, keeping down the rifle fire of the defence. If the rifle fire of the defence is kept down, the infantry attack can be pressed home and should succeed. In support of this, I may mention only two cases which came under my personal observation. One was where three batteries[1] came into action at 2,400 yards against the enemy's main position. In a very short time they overcame the four guns of the enemy, and these did not fire again that day. After that, although we never saw a single rifleman anywhere, we kept down the enemy's rifle fire by very slow artillery fire at the whole line of the position. Whenever the enemy's rifle fire broke out again we simply opened slow fire with our guns, and the rifle fire died away at once. In my opinion, riflemen will not stand up against artillery shrapnel fire with anything like steadiness if the artillery are cool. On another occasion I had a personal opportunity of observing two guns assisting the withdrawal of a squadron of our cavalry after a sortie from Ladysmith. The squadron got involved in a bit of very hilly country, and although we never saw a single Boer, there was a very heavy rifle fire. We all thought the cavalry must be annihilated. From where I was I saw the whole of the movements of the cavalry, but we never saw the men that were firing at them. There were two guns in position under cover, covering the retirement, which fired under the instruction of the officer (who was by me at the time) in command, at wherever he thought the enemy's riflemen might be, and they at once put down the rifle fire. This is all I want to point out. I think I may add as regards our artillery that whatever improvement is going to be made in our *matériel* in the near future, it is in the right direction, and is only what we expected would have to be made before the war broke out.

Admiral Sir N. BOWDEN-SMITH, K.C.B.:—On Monday last, when the Chairman introduced the lecturer to our notice, he said that M. de Bloch would not read the paper himself because he did not feel quite at home in the pronunication of the English language. I am sure you will all agree with me that as far as the wording of the paper is concerned it needs no apology, for it is written in excellent English. This paper presents to us an extension of his views as expressed in that most interesting book of his, "Is War Impossible?" It enlarges on these views, and after considering his paper and reading a pamphlet of his which was left on the seats last Monday, I understand he comes to the conclusion that it is very difficult for any war to be successful; and that, as regards this war in South Africa, the English will not be able to attain their object. I was much surprised to notice in the early part of his paper that he makes light of our long line of communications. He says they play no important *rôle* in the campaign in South Africa, whereas, I understand that our generals are very much hampered by the long line of communications, all more or less in a hostile country. They have to leave such an immense number of their men to guard these communications that the situation becomes very difficult. The author alludes to the great changes in warfare brought about by long-range guns and rifles and smokeless powder, and points out how difficult it is now to scout with any advantage or to make any successful reconnaissance. But there are two advantages the Boers enjoyed which he does not notice in his paper; he does not speak of the great mobility possessed by the Boers, of their being able to be here to-day and 50 or 60 miles off to-morrow. He also says nothing about the Boers fighting out of uniform, which has been a great disadvantage to us. Usually during warfare in a civilised country, if people out of uniform interfere with an invading army, or attack them, they would, if captured, be liable to be treated as bandits and strung up to the nearest tree. Although the Boers had no uniform we have conceded them the rights of war, and whenever we have taken any of them prisoners we have given them the full advantage of prisoners of war; whereas fighting out of uniform has enabled a Boer to pose as a harmless peasant one day, while the next

[1] Two 15-pounder batteries and one 7-pounder battery.—C. M, H. D.

he would take his rifle down from its hiding place and snipe at any column which happened to pass within range of his murderous weapon. M. de Bloch refers to the numerous Volunteers and civilians who have gone out from this country and from the Colonies to take part in the war, and he speaks of the great courage and splendid behaviour of these men. We thank him for this expression of opinion, and we are all proud of our countrymen, from the noble duke to the man in the street, who have gone out to fight for England; but I cannot agree with him in thinking that because this has been successful in the present case, Regular Armies and trained soldiers are no longer necessary. We must not too hastily assume that we can altogether do away with trained men and Regular Armies. Possibly if we had not had the organisation of a trained Army in South Africa, these numerous Volunteers, splendid fellows as they are, would not have been able to accomplish the good work which they did. The lecturer alludes to the hostile feeling shown against us generally by Continental nations. To a certain extent he excuses it by saying that after all some people's feelings come more from their hearts than from their heads: but we know that this feeling exists. We are sorry for it, and cannot understand why it should be so. The reason possibly is because they think the war is an unjust one. I should like however to point out to M. de Bloch that never in the history of Great Britain have our people been so united in a cause as they have been over this war in South Africa, and when we consider Greater Britain, with the exception of parts of Cape Colony, there is not a single one of our possessions or Colonies which has not come forward loyally to the support of the mother country and helped us in every possible way. They certainly would not have acted thus had they thought the war an unjust one. We are very much indebted to M. de Bloch for coming here and giving us this paper. I am sure the Institution likes to hear opinions from any gentleman on the arts of war, especially from one who has studied the question so carefully as M. de Bloch has done: but although we very much value his suggestions and opinions, he must excuse me if I say that I do not altogether agree with them. In the latter part of his paper he tells us that England must return to her old liberal traditions. I say we have never left them. If he knew England and the English better, he would know that we are a most peace-loving nation. It is a very difficult thing to move the English people to war. If we had been lovers of war, we should have gone to war with the Boers long ago; we did not go to war with them until we were compelled to do so, nor until the South African Republics invaded our territory and sent us an impossible ultimatum. Then there was no other course to pursue; and though we admire the courage and endurance of the Boers, though we fully admire also the patriotism that they had shown in defending their country, I think that true patriotism does not require them to continue this struggle until their country is exhausted and their race partially annihilated. The truest and kindest friends of the Boers are those who will now try to point out to them that England, having once put her hand to the plough, will never look back until she has asserted her supremacy in South Africa.

Colonel F. J. GRAVES (late commanding 83rd Regimental District):—You have heard the remarks of a Volunteer,[1] a Member of Parliament, an old friend of mine, and a distinguished admiral. You will now unfortunately be reduced to the rank of a cavalry soldier. His Excellency has, if I may say so—I do not think he will understand the English idiom—simply wiped the floor with us cavalry. His Excellency has paid high and heart-felt compliments in the tribute to the bravery of our British officers and soldiers in the Transvaal, and, as coming from a Russian, I am perfectly sure I only express the feeling of the whole audience in saying they are deeply grateful for the way in which he has expressed himself. The paper is most interesting. The books upon which this paper is based are more interesting still, because fuller, and I think they deserve the close attention of all ranks of our Service. But when we come to the paper of to-day I take

[1] Colonel Sir Howard Vincent, K.C.M.G., C.B., M.P. Owing to a blunder on the part of the shorthand reporter and the absence of Sir Howard Vincent in South Africa, it has unfortunately been impossible to reproduce his remarks.—ED.

leave very humbly to differ very seriously on certain points put forward in it. While I do so, I do not mean to say that I differ with the inner mind of M. de Bloch. The whole trend of this double paper put before us seems to me to be based upon pure and simple ballistics. It takes little or no account of the conditions on the Boer side with regard to the country and so on, and the conditions on the British side. It is based purely and simply on the value of long-range firing, flat trajectory, and the effect of modern artillery and rifle fire as it at present obtains. Now I consider that the lessons to be learnt from the South African War include not only that, but something much further. They include not only the material, but also the qualifications and idiosyncrasies of the *personnel*. May I venture to take up two or three moments of your time by putting this in a short antithesis or juxtaposition? First of all, the Boer was in his own country, with a complete knowledge of the country, a marvellous knowledge of that country, with information anywhere he chose to halt for the night's rest. The farms were depôts of supply, of horses, food, ammunition, etc., and information as well. The British go into a strange country: they have few maps, and most of those very unreliable. They have unreliable information. Supplies had to be carried because the local supplies were uncertain. So much for the conditions; I cannot labour them out. The Boers were mobile, so much so that a small force all being mounted could turn every flank attack we attempted into a frontal attack. The British, on the other hand, for the greater part of the last 18 months were absolutely non-mobile. It is a case of the hare against the tortoise. With regard to the personal idiosyncrasies of the Boer as compared with the British, I do not want to do them any injustice, but I take it that the Boer fights personally to prevent his foe getting at him. The Britisher, I am proud to believe, fights with the view of getting at his foe. The Boer from the time he is 12 years of age is a born stalker. He gets up behind a small rock near the watering place of an antelope, he lies down there, smokes his pipe, lays his rifle, waits till the animal comes along and then shoots. That is just exactly what he has done with regard to the British soldier. The Boer, therefore, in 99 cases out of 100 fights prone on his face, it is part of his job, it is what he has been taught to do; but the Britisher fights, I am sorry to say, mostly straight upright. Therefore, owing to that one difference between the two classes of men, we find greater losses on the part of the British troops. So much for the differentiation between the two classes of people. You have put down in the first part of your paper that the first lesson derived from the Boer war is invisibility. I agree with that. But invisibility, to my mind as a cavalry soldier, only beats mobility (if you understand my metaphor) by a very short head. I think one of the chief lessons to be learnt from this South African War is the great value of mobility. I do not err in that; if I do err at all, I err in very good company. Many of you will remember Sir George Chesney's noted lecture here in the year 1874, when he out-Heroded Herod in support of the value of mounted troops. He says:—"Imagine now what would be the effect of 30,000 or 40,000 horsemen—horsemen fit to act together or fit to act alone—men able to ride across country, across any country in Europe, riding to and fro in rear of an army intercepting its communications, cutting off its supplies, destroying its reserve ammunition and material, creating confusion and panic far and wide. Is it not clear that the larger the enemy's army the greater would be its resulting confusion and disorganisation? Such a mode of attack carried out boldly and without fear of consequences or regard to conventional rule would, I believe, utterly cripple and confound an opposition army of vastly larger size. Thirty thousand men in this way might hold in check 300,000." I rather agree with that, but there are some here who may say: "That is all a matter of theory. Have we ever had anything in military history put into practical effect on those lines?" I say we have, and I am prepared to show from one single fact of military history that had those lines been acted upon at the outset of the South African War, very likely peace would have been declared six months ago. I hold in my hand a translation of a Russian pamphlet by B. T. Lebedev, on the invasion of India, in which the author refers to an incident of some importance, which occurred in the year 1801. That was a lucky year; we are now in 1901 which is just a hundred years afterwards. M. Lebedev says:—"In

the year 1801, the Emperor Paul of Russia made an attempt to carry out a certain plan of campaign by himself. He proposed to attack and seize India. What did he do? He detailed 22,500 Don Cossacks for the purpose." In autograph letters to the Ataman of the Don Cossack troops, General Oilor, the Emperor Paul wrote:—"I trust the whole of this expedition to you, and your troops of cavalry; get them together," and so on. Now mark this point. "The troops of the enemy are similar to yours." Let me just give you a little corollary from the second letter he wrote. He put at the end of that second letter:—"If infantry are required, I will send them after you; but it will be better if you can manage with the force at your disposal." I may be heterodox, I may be an utter radical in this matter, but I believe that if instead of having *now* 70,000 mounted troops in the field against the Boers at this late period of the fight, we had begun with 70,000, the result would have been of a very different character. I say, therefore, that when M. de Bloch declares that cavalry are no good, to take his own words, "for irruptions, for reconnaissances, for making incursions into the enemy's country, for attacks of cavalry *en masse* against cavalry, cavalry charges, meetings of cavalry with cavalry, and so on, or pursuit of a flying enemy," I say there is nothing in the South African War, which has been conducted under exceptional circumstances, which proves his case. I believe that while the action of cavalry in the future may be, and necessarily will be, modified, that they will have a great future before them. I believe that if to-morrow we had twice the number of cavalry out at the front—mark you, well-horsed and not over-weighted—I believe the war would be over in the snuff of a candle. Let me give you one little instance of the action of cavalry in an attack, that came to my personal knowledge from one of the men that I was fortunate enough to select to go out with some of my Imperial Irish Yeomanry. At a place called Koonat, Captain Moore, of the 60th Company of Ulster Yeomanry, had a squadron under his command. He was going out as the flank defence of a large convoy. A commando of Boers about 300 in number was located on a kopje at this place Koonat. What did he do? From a cavalry point of view, I think he did quite the right thing. He happened to know the country well, for he had been over it several times, so that he had that advantage. He opened out his men, twenty yards from knee to knee, they took up all four reins; they sat down and they rode like demons. They swept over the kopje, took a number of the Boers prisoners and the whole of their wagons, and only lost one man wounded and one horse killed. After all, we must remember that cavalry is an arm of opportunity, and when these opportunities are grasped and taken hold of and used in the right way, I say that the sunset of cavalry has not come yet, but that it is in its full noonday. Also the lecturer has been bold enough and courageous enough to hold turning movements in contempt. I should like to know whether a single turning movement was brought into effect in South Africa except by the aid of mounted troops. I believe that such will be the case in any great Continental war. The forces will be so great opposing each other, that it will require turning movements of mobile troops to bring any overpowering force upon any particular point of attack which may be required to be made. Just one word more. The lecturer has drawn our attention to a subject which is seldom discussed or thought of within these walls. Let me very humbly, as a learner myself, commend to the general attention the excellent paper of Captain Murray on the subject of food supply. I believe, with His Excellency M. de Bloch, that in case of even a threat of invasion of these shores following on that of any prolonged tension owing to that threat or owing to preparations based upon that threat, I believe that a greater foe to our Empire will exist in the price, the accelerated and exorbitant price of the four-pound loaf, than the enemy who is likely to land upon our shores; based upon that I believe there is a second enemy with which we shall have to deal even before the Frenchman or the German sets foot upon our shores, and that is the undisciplined, the unruly, and the hungry mobs of unemployed from our great centres of industry.[1]

[1] I venture to take grave exception to the manner in which M. Jean de Bloch completely misrepresented my views and remarks in his concluding reply. Colonel Lonsdale Hale clearly and forcibly expressed what I meant to convey.—F. G.

Captain Sir JOHN COLOMB, K.C.M.G., M.P. (late R.M.A.) :—My chief object in wishing to say just a few words is to express what I am sure everybody feels—the gratitude we owe to the distinguished lecturer for coming here and giving us a lecture full of information, which only a man of his great research and knowledge could possibly give us. But I also am compelled to occupy your time for a moment or two to enter a humble protest against two assertions that the distinguished lecturer makes in the very opening part of his paper, which arise, I think, from a misapprehension of the position of this country. He announces dogmatically that this country—that is, England—is on the eve of radical reforms in the reconstruction of her Army, and a little lower down he speaks of the projected increase of the British Army, with the object of participating in the struggle with Continental Powers. Now I think that ought not to pass unnoticed. In the first place, we are not on the eve of a radical reconstruction of our Army at all. That is an undoubted fact to anyone who pays the slightest attention to naval and military matters in the House of Commons. In the second place, if he looks into the very small things we are doing, he will see we are simply regrouping, for the purposes of administrative convenience, the forces as they exist. We have added nothing to the effective and striking force of our Army at all, excepting, indeed, we have created some battalions of veterans to sit down and wait behind fortifications till somebody comes and attacks them. The rest of our augmentation is simply an augmentation for the purpose of resisting a foreign Army after it has comfortably landed on these shores. We have increased the Yeomanry and given it a new name, and we have proposed to add 50,000 men to the Militia—I say we have only proposed to do it ; we have yet to see whether we get the men. I ask the distinguished lecturer to remember that that is all we are doing and all we have done, and, as far as I can see, all we propose to do. There is no symptom of increasing our power of aggression in that. Therefore, Sir, as a public man, I felt it my duty, at all events, to rise to point out to the distinguished lecturer that those assertions are founded upon erroneous information, which has blown this Army reform frog up into a bull. There is one other point that I should like to make. Of course the whole lecture proceeds in the direction of what the author considers a final conclusion, that is, that war is impossible. Well, Sir, that has been said before. I can see nothing in history to justify any conclusion of the sort. Take the history of the last century. It commenced in war ; then there was a long period of peace. At the middle point of the century, in 1851, all the nations of the world were collected in the Crystal Palace at the opening of the Great International Exhibition. That was taken by everybody to mean the beginning of an era of universal peace. Officially we offered up prayers to the Almighty through the Archbishop of Canterbury, and thanksgivings that nations would learn war no more. What is the fact ? If you take the statistics of the period of the century before that thanksgiving, and the statistics of the remainder of the century after it, I think you will find there was more bloodshed and greater cost incurred in prosecuting wars in the last half than in the first half of the century. Therefore, I think myself, as far as history goes, that it tells against the lecturer. But, Sir, in making deductions from the South African War, and applying them to the case of Continental wars, with all humility I venture to say that I think the lecturer has not paid quite sufficient regard to one broad aspect of the question. It appears to me that he has not considered sufficiently—at all events, it is not shown on the paper—the influence in operations of war, of area in relation to the force employed. Therefore, I refuse to accept deductions made from the war in South Africa, except in matters of minor tactics, and I venture to say they are inconclusive as regards what may happen in Europe. Just let me illustrate very shortly what I mean. The distinguished lecturer, in following out this plan, pictures a war between Germany and France. Now the possible theatre of war in that case is very limited as compared to South Africa. But, on the one hand, that would be a theatre of war with two nations with millions of men, and, on the other hand, in South Africa it has been a war in a vast area with a comparatively small force employed. I suppose that 350,000 or 400,000 is the greatest maximum number of men that ever was under arms on both sides in South Africa at any time during the whole of the war.

A MEMBER :—A great deal less.

Sir JOHN COLOMB :—I prefer, in putting my case, not to overstate ; that is the position. Our difficulties in South Africa have been analogous to the common-place difficulty of finding needles in a bundle of hay. But that cannot arise in the case of an European war. Just let us look at what has happened since the close of the Franco-German War. There has been an immense increase of armed force on both sides, while the frontier remains in extent just the same. What this war in South Africa has taught us, I think, is that the force that can actually be placed in the fighting line in the field on that narrow area is limited by the advance of modern science and the effect of fire. Therefore, to my mind, the question is, not is war impossible, but will it not happen that in Europe, under the conditions of Europe, that it will be carried on in a totally different manner from what it has been hitherto? The question is not only affected by geography, but by population. In Germany or France, the supposed theatre of war, the population is something like two hundred persons to the square mile, but in the theatre of war in South Africa it was less than two persons to the square mile—that in itself must have an appreciable effect on the arrangements necessary, and the mode of operations in South Africa, as compared with Europe. I have already detained you rather long, but there is one other point I should like to make. I think it must be agreed that the day has for ever gone when groups or masses of men can be exposed in the open to the fire of an enemy concealed. That, I think, is absolutely beyond dispute. As our distinguished lecturer refers to invasion, I should like to ask him on a future occasion, at all events, just to press that fact a little further with regard to the question of our invasion. Surely, if you cannot make a frontal attack on land, taking every opportunity of individual shelter that land offers ; if you cannot do that, how on earth can an attempt be made to land a great invading army conveniently grouped and exposed on boats and on rafts on the fair open smooth surface of the sea, under the fire of a very few men and a very few guns to oppose them? Why, Sir, it is practically and absolutely impossible. You cannot attempt it. I hope the distinguished lecturer will bring that home to the mind of England, because I think it requires to be brought home. Before I sit down, there is one other remark I wish to make, namely, that I absolutely and entirely agree with the lecturer that the real danger of England and of the British possessions lies on the sea. It is the economic question of commerce and the protection of commerce in war. Having occupied your time so long, I cannot give my reasons why I differ from him in thinking that the attempt to protect our commerce adequately is hopeless. I think he does not, if he will permit me to say so, sufficiently allow for that great factor in maritime war which is the moral effect produced by a superior force. It is not that we are going to directly protect every merchant-ship, or station ships all over the ocean for the purpose of directly protecting our commerce—that is not the question. The real question for us is the possession of sufficient battle-ships, cruisers, and observer forces, constituting such superior power as to produce the moral effect that keeps the enemy in port. That must be our policy. And while I admit the greatest danger England has to face in the problem of war is the protection of her commerce at sea, I wish to enter a protest against our giving any adherence to the lecturer's conclusion that it passes the possibilities of human accomplishment. I thank you for having given me this opportunity of speaking, and I think we are greatly indebted to the lecturer for so kindly giving us this lecture.

Major-General C. E. WEBBER, C.B. (late R.E.) : — The appropriateness of His Excellency M. de Bloch's lecture to this audience and to this Institution would be doubtful, were it not that the whole essence of our public training is to listen to the other side. This Institution is essentially a place in which we study war ; our respected lecturer's motive is to try and show that the game is "not worth the candle." After reading through his voluminous paper, I am chiefly impressed with the width of the range of subjects upon which it touches, but I am personally most struck with the frequency of the instances in which I find myself agreeing with the author's conclusions, but at entire variance with him as to his premises, and *vice versâ*. My differences with him are remarkably emphasised

in the conclusions he has drawn from the war in South Africa. At the same time, there is a great deal in the paper with which we all more or less agree, and we cannot be too warm in our recognition of the great labour the writer has spent (as he tells us during the last ten years) on his subject. On pages 379 and 380 of this year's JOURNAL of the Institution M. de Bloch will find one reference to his views, which I made in my paper on "Army Reform," read in this theatre on 20th February, 1901. Then I contended that history in every way proves that the fear of wholesale destruction has never been a deterrent of war. My inference is, that civilisation, while it creates more in *personnel* and *matériel*, the loss of which we dread, will only tend to shorten wars and to spread their destructiveness over a shorter time. No, Sir. The more perfect our system of defence, the more we learn to apply science and all the resources of nature for purposes of self-protection, the less likelihood there will be of war. M. de Bloch's premises are so often inadmissible, and his conclusions so often wrong, that I shall leave all but one or two to the other speakers at this meeting. The two papers I have read this year before the Institution will, I think, exempt me from being classed amongst what M. de Bloch describes as the "military routinists." Very soon after the invasion of the Colonies I wrote publicly as follows, to try and demonstrate that:—"The result of the so-called 'mobilisation' of horse, foot, artillery, and engineers, in the 'regulation' proportions of each arm, was quite unsuitable for the conditions by which (with all the knowledge of the past in our records), when war became inevitable, the country was faced in October of 1899; and that a *mobility* of the rifleman, inferior to that of the enemy, had been the underlying and disabling factor in the case of every failure or check which had up to that time occurred in the operations for the defence of the Colonies and the relief of the invested places." Let me ask M. de Bloch to consider that, if the British foot soldier's average rate of movement is 1, that of the Boer on his horse is 2, and that the day's average march at 2½ miles an hour of the former is 10 miles, while the Boer can move at the rate of 5 miles an hour over 20 miles of ground. Simple arithmetic shows that the latter has an advantage, individually and collectively, of 4 to 1 over the former, until only the bayonet separates them. When the history comes to be told we shall find this deficiency in mobility in the largest proportion of our troops, in comparison with that of the majority of the Boers, has told on every occasion when they have been in touch. Our generals were forced to attack positions because they could not mask, turn, or ignore them. And these were positions which the mobility of the Boer enabled him to occupy, change his front, or abandon, at his pleasure. In European warfare, when the relative proportions of the three arms is somewhat similar in the opposing armies, if infantry at heavy sacrifice captures a position from infantry, they reap some reward. In this war the result was comparatively insignificant. The value of each arm and its preponderance in Europe varies slightly with the conditions of country and of organisation, but there is no example in which all the infantry is mounted, and all the cavalry is mounted infantry. The conditions I have described, would have existed, with every European Army, no matter whether French or German, Italian or Russian, that had to be sent across 6,000 miles of sea to carry out the same task. My hearers will therefore understand, I claim, that the standpoint of M. de Bloch's view has a very defective foundation, and that the ground for his conclusions is equally unsteady. Let us take No. 2 of his subjects (page 1320), on the *constant impossibility of determining the enemy's position*, and his attributing *the failure of the reconnaissances to the new conditions of war*. This impossibility and this failure were due solely to the superior mobility of the *gros* of the Boer army (if we can call it a *gros*) in their own country with horses accustomed to work and live on the veldt. This constitutes no "new condition of war" using our lecturer's own words. It is much to be regretted that he did not complete his study by a visit to South Africa. I have stated elsewhere, that, both as regards natural (geological) and artificial (houses, fences, enclosures, villages) features, there is only the remotest resemblance between South Africa and Europe, the greater the civilisation in the latter Continent the remoter it is. Where did he get his information, namely (see page 1322), that "the greater part of South Africa is, compared with

much of Europe, absolutely flat"? But, to return to the question of *mobility*, whether on the flat or on the mountain side, South Africa is the ideal country for warfare with mounted riflemen, especially if man and horse belong to the country. European infantry organisation is out of place, except for the defence of towns, posts, and lines of communications. It was *only* their mobility, added to their knowledge of the country, that enabled the Boers to effect surprises and captures during the early stages of the war. How blind the best students of war throughout Europe have been to these conditions is a poor excuse for the misunderstandings, misrepresentations, and reports as to our Army, with which Europe has been flooded for the last two years. I do not support M. de Bloch when he says "the same mistakes and want of foresight which we have seen among the British would have been reproduced by the Germans," because I believe that, with the German military system, *if* it had been possible to have brought about the same situation that exists in South Africa after a century of German rule, our neighbours would have had man for man, a mounted rifleman, ready to take the field, with which to meet the Boers. But if any Continental Army had faced the Boer invasion under the same conditions namely, riflemen on foot against riflemen on horses, the statement our friend quotes (and repudiates) namely, "any Continental Army would have beaten the Boers long ago," only proves the ignorance of those who made it. It has been so-called non-jingoism, or non-militarism, the namby-pamby so-called humanitarianism (which always ends in producing the most suffering), it is "peace at any price"—into which our friend wishes us to retire—which has brought about a state of things, unparalleled in the history of nineteenth century warfare. These critics do not the least understand that if Baden-Powell could have maintained 500 mounted riflemen in Mafeking, he would never have allowed the Boers within 10 miles of the place. In subject No. 6, M. de Bloch commits himself to "the essential," and he calls it *invisibility*. If he had written *mobility*, he would have shown that he understood his subject better. There is not a single little war in which our Army has not dressed and equipped with *invisibility* in view. It is common knowledge with us. In the same part of his lecture headed "frontal attacks," he says the Boers had "no training." On the contrary, I say, they were, in their capacity of mounted riflemen, as nearly the makings of George Chesney's "invincibles" (described nearly 30 years ago in this room) as could be. Contradicting himself under heading No. 7 (page 1331), he calls the Boers "soldiers by birth." He couples with this their use of cover (I will not call them trenches), and continually refers to their "entrenchments," yet, he says, they had "no training." It was *only* their *mobility* that enabled them to mislead reconnaissances, to shift their line of defence with rapidity, to disperse and concentrate at points on that line, to occupy, or not occupy, their so-called entrenchments until the last moment—in fact, to follow tactics, denied to riflemen on foot in a primitive country when the opposing riflemen are mounted. One more word in defence of our "Regular Army." M. de Bloch lauds the civilian, the amateur, the colonial troops, but he tries to prove too much. Why did he not get at the fact, namely, that the "Colonials" and the "English Yeomanry" were all mounted as soon as they landed? Of course, against a swarm of mounted riflemen, to use his expression, they "were infinitely more useful than the Regulars." Yes, possibly, so long as those Regulars had to toil on foot. But does he know that we have had 10,000 mounted "Regular" infantry in the field, besides these Colonials and Yeomen? And that the work of Lord Roberts' forced marches and crushing blows would have been absolutely impossible without our cavalry and the mounted infantry? And does he know that, although few in number, our cavalry acted practically as mounted riflemen, and, as rapidly discarded the *rôle* of the *sabreur* as they will, no doubt "under regulations" have to re-adopt it when they return to Europe? As our Chairman has said, the *notes* to M. de Bloch's paper are full of interest, although it is ouside the subject to which I have tried to confine myself, I should like to say a word about the "War of the Future." My paper read here on the 20th February last does not admit that I agree with General von der Goltz that "the battle of the future is a sphinx of which no one has expounded the riddle." The subject is one of

enormous interest, and must be treated on similar lines both for war on sea and on land. I hope that the Council of the Institution will allow me to stand again on that platform and try to disentangle its problems.

Admiral the Hon. Sir E. R. FREMANTLE, G.C.B., C.M.G. :—M. de Bloch has argued throughout that war has become practically impossible on account of the great loss of life which must be, he holds, the result of improved destructive weapons. The argument is a deductive one, and the only facts to which he has referred are those resulting from our present war in South Africa. These, I submit, do not support his view, and it is nothing to the purpose to show that the improved weapons have necessitated a change of tactics. In looking forward it appears to me that the safest guide is to draw conclusions from the lessons of history. Do these show either that actions and campaigns have been more bloody and less conclusive in recent times? I submit that the contrary is the case. In the diagrams on the walls I observe that reference is made to naval developments, and I will take them first. Neither the Yalu battle, Manila, nor Santiago was specially bloody, but all three were sufficiently conclusive: and if we turn to historical sea fights, the loss of life at Trafalgar was small compared with Actium or Lepanto. The same may be said of land battles. At Arbela, 330 B.C., 300,000 Persians are stated to have been killed; while at Cannæ, 716 B.C., 40,000 Romans are supposed to have perished out of a total of 138,000 engaged. Again at Tours, 732 A.D., 75,000 Saracens are supposed to have been killed. This, however, is ancient history, and probably the numbers are much exaggerated. But at Bannochburn in 1314 some 50,000 lost their lives out of 130,000 engaged. Let me turn now to the Napoleonic wars, and we find a loss of 80,000 out of 400,000 at Leipsic; while at Gravelotte, the most bloody battle of the Franco-German War, the loss of life did not exceed 44,000 out of much the same number engaged. In all wars the loss of life in action has borne but a small proportion to that caused by exposure and disease, and our war in South Africa has been no exception to this rule. If then, this has not prevented wars in the past, I see no reason why it should do so in the future, and I cannot accordingly concur in M. de Bloch's conclusions that peace is more likely to follow our war in South Africa than it was to result from the International Exhibition in 1851. I cannot follow this subject, but I think we may fairly hope that as civilisation progresses there may be increased reluctance to have recourse to war; but until we can produce a power like "Vril" in Bulwer Lytton's "Coming Race," which can destroy armies wholesale, I am incredulous that wars will cease in all the world through any modern developments of instruments of warfare.

The meeting was then adjourned to Monday, 15th July, to enable M. de Bloch to prepare his reply.

15th July. Major-General Sir F. MAURICE, K.C.B., in the Chair.

Colonel LONSDALE HALE (late R.E.) :—Before I read the reply of M. Jean de Bloch to the discussion on his lecture, I have one remark to make. There is one point in the lecture which I think it desirable to bring to the notice of M. de Bloch, and also to those who listen to the lecture. In the second lecture the lecturer said:—"Just as Plevna was a revelation from the point of view of the use of entrenchments, the South African War has been a revelation from another point of view, showing not only the superiority of the defensive, but also the enormous increment of strength given to a civil population's resisting power by smokeless powder and the modern rifle." I venture to differ from that entirely. The South African War is no example to us of a war between France and Germany, with French and Germans fighting for their independence. We have carried on the South African War on the strictest principles of humanity; but no nation in their senses, French or German, or any other Continental nation engaged with each other, would every carry on a war on the same humanitarian principles against each other as we have been compelled to do

in South Africa. They would not form refuge camps for the women and children; they would not accept the oath of gentlemen found in plain clothes with rifles, and then release them. I think there is nobody in this room, or anywhere else, who knows more about the way in which the Germans carried on the war in 1870 than I do. I had the advantage of being at the Conference on the "Usages of War" which was held three years afterwards, and I learnt much about it also there. I am perfectly certain that in any Continental war, whether it is France, Germany, Russia, or anyone else, they will carry on their war with the utmost rigour: they will shoot the people they want to shoot, who get in their way; they will not be directly cruel to women and children, but they will not provide for their sustenance. They will burn their houses and terrorise the nation, as well as destroy the armies. To my mind, that is a far more kindly way of carrying on a war than on the humanitarian principle. There is one other point to which I would draw attention. M. de Bloch says:—"In a war between Great Powers, as I have attempted to prove, there is no prospect either of great victories or of definite gain by means of arms." I differ a little from that. Surely there will be human beings carrying those arms? Surely there will be generals who make mistakes, and surely there will be generals who make the fewest mistakes who get the better of those who make the most mistakes? It appears to me that the lecturer has gone rather far in thinking that by giving a poor feeble creature a powerful weapon that he will alter the man himself. I do not think he will. M. de Bloch has given us his ideal of a position manned by indifferent troops. The description corresponds almost word for word to the position of the French defenders of Orleans on its western side on the 4th December, 1870, and also to the character of the defending troops. Here an "accident" occurred. A successful charge of a small body of German cavalry against a few French cavalry eventually produced such a panic among the infantry, ridden over by their own people, that the outer defences were abandoned, and a German column marched through the defences right up to the south-western gate in the city walls, demanded the evacuation of the city, and it was Germans—not French—that passed the night of the 4th December in Orleans.

M. Jean de Bloch's reply was as follows:—

I must ask your indulgence and pardon if my reply to the criticisms passed upon my lectures should seem too long. But the matters dealt with in those criticisms are of great importance, and to attempt to answer them otherwise than in detail would result in failure. In regard to Sir Howard Vincent's interesting remarks, I have very little to say beyond thanking him for his appreciation of my work. Sir Howard Vincent says that he has extracted from my lecture over forty direct propositions or teachings, each of which claims careful examination. I think that it is his own profound intellect for analysis which has developed the conclusions urged by me. I am glad to see that Sir Howard Vincent in his lecture delivered here a year ago was in accord with me as to the importance of entrenchments and invisibility in all tactics and in all the conduct of war, and his conclusion on the latter subject cannot be too often repeated:—

"When the Army comes home, you will be surprised to find how few members of it have ever seen a Boer, save with a flag of truce, or as a prisoner. I did not meet half-a-dozen officers in all Sir Redvers Buller's army who saw one at the battle of Colenso." He cites another extract from the book "The Work of the Ninth Division":—"No human interest, a bare plain, and 800 yards off a line of trees, not a Boer or even a puff of smoke to be seen all day. Only if one raised his head, the ping of a bullet, and the sight of another dead or wounded comrade." Again, a general writes in February, 1900, in the Orange Colony:—"We have nearly as many guns as spades, but I am inclined to think the humbler and rather despised engine of war was the more useful of the two." And again:—"You may return to Warsaw, assured that you have contributed something to press home Lord Roberts' teaching in the field that attacking troops to live must in future be at least 20 paces apart; and other and humbler convictions that soldiers cannot attack in the face of modern weapons other-

wise than in loose formation, avoiding as far as possible the sight of the enemy, creeping behind inequalities of the soil, digging themselves into it like moles."

In these few words it seems to me that Sir Howard Vincent touched with a master's hand the true causes, the true solution of the failures of the British Army; that is invisibility, the importance of the spade, the impossibility of advancing by German regulations, whether in partial attacks, or in the deployment of armies composed of brigades, divisions, or army corps. The points raised by Sir Howard Vincent are all the more useful, as they facilitate what I wish to say concerning the remarks of Colonel Downing and Colonel Graves.

Colonel Downing's remarks on the question of artillery preparation are of the utmost importance, especially if we admit, as is generally admitted, that a preliminary superiority of artillery fire is essential to the success of infantry attack. Now, on this point my argument was that against entrenched men, artillery fire was proved to be almost worthless, and I declared that the South African War reinforced the lesson of Plevna, which, in Todleben's words, was: "We would fire with our artillery a whole day for the purpose of killing a single Turk." Colonel Downing, whose high authority I gladly recognise, expresses dissent from my contention. He says emphatically that "there is no difficulty in keeping down rifle fire with artillery if properly used." Now this objection is a most important one, and if it can be sustained it destroys a great part of the argument as to the difficulty of attack under modern conditions. I am, therefore, compelled to examine shortly the facts cited by Colonel Downing. It appears that he can quote only one engagement of importance in which the British artillery overcame the Boer guns, and kept down their rifle fire. But this engagement was of such a nature that it proves absolutely nothing. In the first place, the battle of Rietfontein was a small and indecisive engagement, only intended to be a demonstration and reconnaissance in force. It was fought for the purpose of keeping the Boers engaged, and facilitating the retreat of the British from Dundee; and as it never developed into a serious attack or close approach to the Boer trenches, it is quite impossible to say definitely whether the artillery had any real effect upon the Boer defence.

In the second place, Colonel Downing tells us that the British had three batteries of artillery, or eighteen guns, against four Boer guns; such a superiority that, even if the objects of the defence had been very important, it would have paid them better to have withdrawn their guns from the duel in order to bring them out when the infantry attack was approaching, and the attacker's artillery had ceased fire. But as the infantry attack at Rietfontein never came to close quarters, we are quite unable to say that the Boer artillery was really and finally put out of action. Even Colonel Downing only says that the Boer artillery fire was "kept down" while the British continued firing. In a normal war it is quite impossible to expect such a superiority on the attacker's part as eighteen guns against four. And how would the artillery have served the attack if they had not been destroyed—by firing over their own infantry's heads? General Skugarewsky, formerly Chief of the Etat-Major of the Russian Guard said:—"See what happens in firing in time of peace. The targets are at a distance of some hundreds of metres, and many shots strike the ground a dozen paces from the marksmen. What shall we see in time of war with Reservists! Fire above the heads of one's own soldiers will certainly be a most dangerous operation." The South African War proves how reasonable are these remarks, for there were many cases of the advancing British infantry being struck by their own artillery fire. But how can we attribute any importance to this single incident—a battle which neither side regarded as serious, and in which the Boers had not prepared for resistance with entrenchments, as they always did in the important battles of the war? Is it reasonable to cite a single exceptional instance when we know that the other battles of the war taught precisely the opposite lesson? In my lecture I cited the astonishing cases of the artillery bombardment at Paardeberg and Spion Kop, which showed that guns employed against entrenched troops were some nine hundred times less effective than when employed against entrenchments. It is impossible to prove that these deductions are

erroneous, and it would be particularly difficult for Colonel Downing, who so admirably succeeded in defending Ladysmith against the Boer artillery with little loss—thanks to entrenchments and bomb-proof shelters.

At Ladysmith four months' bombardment produced a casualty list of 232 men killed and wounded, or about two men per day—a little more than Todleben's "one Turk a day." At Kimberley and Mafeking the artillery produced the same insignificant results. In short, the whole experience of the war showed that artillery produced little or no effect upon riflemen, *if these latter were well entrenched*. When, as at Spion Kop, artillery was turned against exposed men in close formation, the results were very great.

It will be objected, of course, that the effect of artillery is a moral effect. But no moral effect was ever produced against the Boers by artillery fire. Moral effect, it must be remembered, depends on fear, and on fear alone. When entrenched men are fully convinced, as the Boers were, that they have nothing to fear from artillery, we cannot expect that their *moral* will be in any way shaken. But Colonel Downing makes an important reservation when he says that "if properly used, there is no difficulty whatever in keeping down the rifle fire of the defence." And in that case, he adds, "the infantry attack must succeed." Now we know that the British infantry attacks did fail even when attempted with a large numerical superiority. At Modder River the frontal attack made by 7,000 British against 4,500 Boers failed with heavy loss. At Magersfontein 12,000 British attacked about 5,500 Boers, and were repulsed with heavy loss. At Colenso 20,000 British attempted a frontal attack upon about a quarter of that number of Boers, and were beaten back, leaving 11 guns in the hands of the enemy. At Spion Kop the British were in still superior number, yet they were driven back across the Tugela with a loss of nearly 2,000 men. Finally, at Paardeberg some 16,000 British with enormously superior artillery attacked 4,000 Boers, and were repulsed after losing 1,300 men, the Boers losing not a tenth of that number. In most of these battles the Boer losses are not definitely known, but according to their reports they were not more than a tenth of the British. At any rate, we know that at Paardeberg they lost even less than that in proportion, and there is therefore no reason to doubt the accuracy of their declarations on the subject of losses in the other battles.

It is necessary therefore for Colonel Downing to explain. For there is nothing to show that the artillery was not properly used. The regulations were followed, and they are about the same in all Armies, that is—employment of masses of guns, unity of fire command, employment of the ground to bring the batteries into action under cover, co-operation and mutual support of the various arms. Foreign evidence confirms this. The Austrian attaché, Captain Trimmel, of the General Staff, said that the accuracy of fire was certain, "for shrapnel cases were found scattered freely within from five to ten paces of the Boer works." The shell fire was equally ineffective, as shown by the losses and the case with which the Boers held to their entrenchments. Sir Howard Vincent in his lecture, delivered a year ago at this Institution, tells us exactly the same thing, when he says:—"The opinion that ten minutes of infantry fire causes more damage than ten hours of artillery merits study."

In a work which has since appeared, the German artillerist, General Hauschild, studies this question, and I have already cited what he said:—"Nothing remains for the attacker but to have recourse to trenches and earthworks. But it is obvious that for this the attack is in a much less favourable position than the defence. As a prelude to assault an attempt must be made to destroy the structures sheltering the troops in reserve, and this cannot be done without howitzers and heavy siege guns, and is an almost impossible task, owing to the rapidity with which, as at Plevna and in South Africa, new works can be thrown up." I have cited also the opinions of other soldiers, the German generals, Rohne, Müller, Janson, von der Goltz, all against Colonel Downing's view that attacking artillery must succeed.

The second example given by Colonel Downing of the help rendered by the guns in the withdrawal of a squadron of cavalry near Ladysmith, belongs to the same category.

Colonel Downing finishes by saying that "whatever improvement is going to be made in our *matériel*, it is in the right direction." I can only conclude that no matter what improvements are effected, you will change nothing. The defender as well as the attacker will adopt all improvements, and as he will still have the advantage of invisibility, of having his defences prepared in advance, of having his guns masked, his position studied and measured, and, finally, as General Pellet-Narbonne says, of forcing the attacker to fight on country chosen by him; it is he who will profit most from improvements; and the comparative advantage of the defensive will be still further increased. The reason why Colonel Downing will find it difficult to admit this, I find in Sir Howard Vincent's words, that "no artillery officer will ever admit that his range-finder and his careful laying were ineffective." For these reasons I am unable to agree with Colonel Downing that artillery can be relied upon to shake the defence of men who are well entrenched. And Continental artillery, I must repeat, will have to attack artillery of equal or greater power, and permanent fortifications, not as was the case in South Africa, a much inferior number of guns posted behind temporary earthworks.

Colonel Graves' first objection is that my arguments were based only upon ballistics, such as the value of long-range firing, flat trajectory, and the effect of modern artillery and rifle fire, and that I did not take sufficient account of the conditions of the country which were favourable to the Boers. Colonel Graves' objection comes a little too late. I have heard it many times from the military defenders *à outrance* of the *status quo*, who declare that the improvements in arms lead to nothing, since the farther they go, the more they become dangerous, the more chance is there that the defenders will lose their heads, and then "the rifle is worth no more than a pitchfork." But the South African War refutes all these arguments. The Boers never lost their heads and did not fire badly. Therefore I should like to point out why what Colonel Graves calls ballistics has changed the rôle of cavalry. The value of cavalry in the past consisted in its swiftness multiplied by its mass. A mass of cavalry launched at a gallop against a line of infantry vanquished by inspiring among the infantrymen the fear that that mass would fall suddenly upon them like a storm. From the moment the cavalry was launched at a gallop for the attack, as in the days of Frederick the Great, of Napoleon, of the Crimean War, up to the moment of impact, it could be struck with only one volley or at most by two, and this was of little danger owing to the high trajectory, the clouds of smoke, the want of precision of fire, and the comparatively small penetration of bullets. The infantry square once broken was then exposed to destruction. But with the new rifle, and the new formations of battle, even in 1870 cavalry attacks became an illusion, with few exceptions. To-day every petty detachment of infantry forms a fighting unit so powerful, as I have shown in my lecture, that if a company of infantry, that is to say some 200 rifles, begins fire against cavalry at 800 metres, before the charging cavalry can arrive within 100 metres they may have killed some 520 horses. In this respect the conditions of cavalry are absolutely changed. I speak only of fire from 800 metres, but we have Lord Methuen's testimony to the fact that it was impossible to sit on horseback within 2,000 yards of the Boers. With the defending infantry always entrenched how can we speak of cavalry attack?

But that is not all. Another essential condition of cavalry attack, the action of the mass, exists no more. Colonel Graves says himself that Captain Moore of the Ulster Yeomanry made the men charge with 20 yards apart. To quote his own words: "Captain Moore opened out his men, 20 yards from knee to knee." But this in no way resembles the massed cavalry attack which I declared to be obsolete. For such reasons I do not find that my conclusions in this respect have been shaken by Colonel Graves. In regard to his reproach that "I take little or no account of the conditions on the Boer side with regard to the country, etc.," I may say, firstly, that I wrote only of the application of the lessons of South Africa to a great war, and in no way with the object of criticising or praising the British Army. If my judgment has been favourable it is because it is my profound conviction that no other cavalry would have done better,

and that those soldiers who most criticise the British do so to a great extent against their own convictions, such being the *mot d'ordre* from above. But in regard to this reproach that I have not paid sufficient attention to local conditions, I was quite aware that the objection would be brought against me, and I considered this question of the local conditions for cavalry very closely. But the conclusion I came to was that though South African conditions are very different from those of Europe, it does not necessarily follow that the advantages for the defence are greater in South Africa than they would be in Europe. The fact that the British largely outnumbered the Boers is on its side a "peculiar condition" of the South African War, for in the Franco-German War, which I have considered, the combatants will be equal, and the defenders will have prepared their positions in advance; therefore in this most important factor, the European conditions are much more favourable for defence than the South African conditions were.

Again, Colonel Graves speaks of the great advantage of the Boers in fighting in their own country, and of obtaining information from the inhabitants. But this is one of the conditions of the defence everywhere, and one of its greatest advantages. If the Germans penetrated into France they would meet in this respect even greater difficulties than the British, for they would have no friends, whereas the British had resident Englishmen and Kaffirs to supply information. This is one of the chief advantages of the defence, and it applies everywhere, and not only in South Africa. But I think Colonel Graves is still less consistent on another point. He agrees with me as to invisibility. He says:—"But invisibility, to my mind as a cavalry soldier, only beats mobility by a very short head." If Colonel Graves persists in comparing the two qualities, I will answer him in the same way by saying that mobility will serve very little against invisibility. Suppose you have the speed of Fournier's automobile, it will not serve you against me, if I remain invisible. But Colonel Graves proceeds to speak of the superior mobility of the Boers, owing to which they were able to turn every flank attack into a direct attack. But, surely, other armies might have done the same, even if they possessed only the *same* mobility as the attacker. General von der Goltz says that of 100 attempts at turning movements, 90 end by coming upon the enemy's front. The Boers were fighting on interior lines, and, therefore, quite apart from their mobility, they had every opportunity to turn flank attacks into direct attacks; and not only will the European defender have this advantage, but a much greater one, since entrenched camps and fortresses will give him what the defenders did not possess in South Africa, as well as full protection for his flanks. I agree entirely with Colonel Graves as to the value of mobility. But I have been dealing with European conditions, in which the mobility of all Armies is about the same. Colonel Graves says that mobility would have been very useful for the British in their first attacks. That is quite true, if they had been more mobile than the Boers. But the attacker in the Continental war which I have considered will not be more mobile than the defender, and, therefore, I do not regard mobility as a determining factor in a Continental war.

Very characteristic, but unfounded, is the objection made by Colonel Graves when he says, to quote his own words:—"The Boer fights to prevent his foe getting at him; while the British, I am proud to believe, fights with the view of getting at his foe." Surely the question here is not who fights in the most chivalrous and romantic way, but who fights best with the object of gaining victory. The question is merely which is the best way of fighting under modern conditions. Now, as Colonel Graves makes this comparison for the purpose of explaining British reverses, we must come to the conclusion that the unromantic Boer way is the best. But if this is so, this is the method which will be adopted in a Continental war, in spite of all regulations and manœuvre drill. The French, for instance, are a very chivalrous and romantic race; but when it is a question of defending their fatherland, they will fight in the way that is most likely to gain victory, and not in the way that looks best in a picture. Therefore, if the Boers were most successful because they lay behind entrenchments, never exposed themselves, and crept instead of walking, they merely adopted themselves to

new conditions of war, and did what Continental military men have often declared it was necessary to do. There is no use in accusing the Boers of fighting in an unromantic way. Their object was to gain the victory; and if the so-called Boer methods, that is to say, ingenious entrenchments, creeping attacks, and a general preference for the defensive, are the best, we may be sure that they will be adopted in a future war. Colonel Graves says that, as a consequence of this differentiation, "we find greater losses on the part of the British troops." Exactly. But that the Boer method did not waste lives unnecessarily is its best justification.

To those who do not agree with this opinion, I will say that it is unworthy to regard war from the point of view of a sportsman, and to regard an Army as an instrument for seeking adventures, and showing address and audacity. Those who regard war in this light had better go hunting lions or competing in championships. The sacrifice of a single life merely in order to show heroism is nothing better than a crime. The sense for appreciating and admiring what Colonel Graves admires is probably lacking in me, but I fancy that all the mothers and all the wives and children will be on my side in this respect.

Colonel Graves objects to my general statement that the rôle of cavalry in attack has disappeared. I said that cavalry reconnaissances and attacks against infantry, cavalry *en masse* against cavalry, and cavalry in pursuit had lost their old value. Colonel Graves' objections are very characteristic, and show how a great number of soldiers have forgotten and learnt nothing. That is why I will deal a little further with Colonel Graves. He cites, for instance, the opinions held in 1801, when the Emperor Paul of Russia ordered the Cossack invasion of India, and the opinion held in 1874 by Sir George Chesney on the rôle of cavalry in invasion. But this is begging the question, which was the effect of *modern* changes on cavalry. What has happened since 1801 and since even 1874? The horse has remained the same, but the power of the defensive in consequence of the improvements of arms and entrenchments has multiplied a hundredfold. Obligatory service has made it possible to organise the defence of frontiers by hundreds of thousands of reservists, which did not exist in the past. The whole of my thesis is based on the changes which have taken place since 1874. Therefore, Colonel Graves' argument from past history is beside the question. Nor do I believe with Colonel Graves in the possibility of raids by cavalry with the object of devastating the enemy's country, and I find in accord with me the German official *Jahresbericht*, for 1900, which tells us that:—"The idea is gaining ground with regard to the proposed incursions of great masses of cavalry into the enemy's country during the first stage of mobilisation, that the gain would not be equal to the price paid. With a well-organised and active frontier guard, flying columns could succeed in drawing hostile cavalry into positions where it would be enveloped and broken up, by depriving it of rest and food, so that the cavalry thus sacrificed would be lost for subsequent operations."

Russia, with her great masses of Cossack cavalry, is the only country which might prove an exception, and that would be only by sacrificing a considerable part. But I cannot see what good effect such sacrifices would produce. I have shown also that reconnaissances in force such as those projected by von Moltke in his plan of campaign are absurd nowadays, when the effect of rifle fire is so great that Lord Roberts, as he lately told us, had to increase the distance between the files in infantry attack from 6 paces to 10 and then to 20. And it is necessary again to recall Lord Methuen's observation that "it is impossible to sit on horseback at less than 2,000 yards from the enemy."

In conclusion, I may point out that the British cavalry in South Africa was never able to be used for attacks against infantry. What is important still more is that cavalry was generally useless for pursuit, and for turning retreat into rout, as it was in the past; always because, owing to the great distances at which battles were fought, the horsemen, kept in the rear or on the flanks, were exhausted before they could come into contact with the retreating Boers. Against this Colonel Graves again advances the old argument of special conditions. I am quite willing to admit the special condi-

tions. But these conditions, the great distances, the thinness of the population, do not largely affect the tactical lessons of the war. They had a great effect on British strategy, on the line of advance, the food supply, and the difficulty of permanently occupying the country. But surely it is too much to say that these conditions changed the tactical features of every battle.

What Colonel Graves says about cavalry having a great future is also very characteristic, and it is worth repeating literally :—"Let me give you one little instance of the action of cavalry in an attack, that came to my personal knowledge from one of the men that I was fortunate enough to select to go out with some of my Imperial Irish Yeomanry. At a place called Koonat, Captain Moore . . . had a squadron under his command. . . . A commando of Boers, about 300 in number, was located on a kopje at this place, Koonat. . . . He happened to know the country well. . . . He opened out his men, twenty yards from knee to knee ; they took up all four reins : they sat down and they rode like demons. They swept over the kopje, took a number of the Boers prisoners and the whole of their wagons, and only lost one man, wounded and one horse killed." But I think that every intelligent man without being a tactician or a strategist, will say that Colonel Graves recounts a tale which is quite exceptional and enigmatical. How could 180 men on horseback under ordinary conditions attack 300 Boers on a kopje with a single man wounded and one horse killed ? If the cavalry had been massed, we might find an explanation in the moral effect which it produced on the Boers. But this cavalry charged with 20 yards from knee to knee ; and the 300 Boers armed with Mausers were so terrified that they could not put a single man out of action! Colonel Graves says that cavalry is an arm of opportunity. Quite true ; but the question is whether the opportunity will present itself. This is what Colonel Graves has not satisfactorily answered.

Again, consider the question of turning movements. Colonel Graves says that I "have been courageous enough to hold turning movements in contempt." This is a mistake. I defended turning movements, and pointed out that if frontal attacks were impossible, turning movements must be the only means of forcing the enemy's retreat. What I pointed out was that South Africa showed that turning movements required a great superiority, and that no Continental attacker would possese such a superiority. In this sense cavalry had enormous importance in South Africa, it was the determining feature of the whole situation. But the cavalry was mainly used as mounted infantry.

But what I did state was that cavalry had lost its importance in a Franco-German War, at any rate at the first attack, which I do not believe could succeed. The first condition for turning movements is exposed flanks. But on the French frontier, where will a daring German cavalryman find exposed flanks ? The French frontier, with the exception of two openings intentionally left, is completely guarded by a chain of fortresses and fortified camps. The openings may be guarded by entrenched riflemen in lines ten or twenty times thicker than the Boers had at Colenso and Magersfontein. But we all know that cavalry cannot charge fortresses ; can they charge entrenchments ? I would ask Colonel Graves to point out one position on the French frontier which might be turned by cavalry. If the first two French lines of defence were broken down, then cavalry might undoubtedly be used for turning impregnable positions. But it cannot be used during the first attack. But if, as I believe, the first attacks must fail, since they must be frontal, what rôle can cavalry have ?

When a position cannot be taken by direct attack, and it has nevertheless exposed flanks, a well-made turning movement with cavalry or mounted infantry may be successful, though even then the defender on interior lines will more likely easily turn it into a new frontal attack. But if there are nowhere in a great Continental war exposed flanks which can be turned, how can cavalry be used ? For England which has to fight in her Colonies with savage people it is another thing. But here, of course, are special conditions which I do not discuss, the object of my study being very different. All I would say is that for these objects the British cavalry must be specially created and trained for its special purposes, and not for a Continental war.

The questions treated by Sir N. Bowden-Smith, though very important for England, are really political, and do not touch upon any essential part of my theory. Admiral Bowden-Smith referred to my pamphlet "Lord Roberts' Campaign and its Consequences," and he seemed to misunderstand the object of that pamphlet. The pamphlet was written in the early spring of 1900, when Lord Roberts was gaining his first great successes over the Boers, and its object was to point out that such successes would not necessarily terminate the war. At the time the pamphlet was written public opinion in England was almost unanimous in agreeing that Lord Roberts' successes would continue, and that the end of the war would rapidly approach. In my pamphlet I made it my object to controvert that opinion, for though I was in agreement with English critics that Lord Roberts would march successfully to Pretoria, I differed from them in thinking that that would mean the end of the war. I pointed out, firstly, that the modern rifle was primarily a guerilla weapon, and, secondly, that the Boers were the best guerilla material in the world; and from these two facts, taken together with the character of the Boer country, the lack of railways and roads, and the thinness of the population, I predicted that a guerilla war would follow the breakdown of the regular Boer resistance, and would certainly last a very long time. But Admiral Bowden-Smith is mistaken in thinking that I declared that England could not end the war. I declared specifically that she could end it, but that the only means of doing so was by gradually wearing down the Boers, and that that would take a long time, and involve much loss in men and money. In particular, I pointed out that England would lose heavily from disease, and that great difficulties would be met with in supplying the men with food and guarding the railways. This pamphlet was written before the outbreak of the guerilla warfare, and I think I can, therefore, claim that my predictions have been amply fulfilled. But in writing it I had no political object whatever, and I expressly declared in it my faith of England's love of freedom and peace. My present lectures had absolutely the same purely scientific object, and I think it is useful to declare formally that I have no wish to express any opinion in regard to the political problems of the present struggle. If I spoke of the necessity of a conciliatory policy, it was as a general lesson for the entire world, and it was expressed in view of the danger of national wars, which has increased for two reasons: the long range and great accuracy of fire of modern rifles, and the use of smokeless powder, on the one hand; and, on the other, the profound sentiment of nationality which exists everywhere. Admiral Bowden-Smith makes, perhaps, too little of these factors; and, on the other hand, he supposes that the special conditions of South Africa are the principal cause of the difficulties met with by the British. These conditions, we are told, are the great mobility of the Boers, the thinness of the population, the scantiness of local resources, difficulties of transport owing to the great distances, and to the absence of a uniform among the Boers.

It seems to me that these objections are not all well founded. The importance of the Boer mobility was great owing to their small numbers and their lack of regular lines of defence, fortresses, and entrenched camps. The want of local resources would, on the contrary, be infinitely greater in Europe than in Africa, in spite of the greater density of the population. Again, guerilla warfare would begin only a long time after the opening of hostilities. At the first, the hundreds of thousands of troops on both sides would probably rest on the same lines, so that it would be impossible to trace their movements on the map. "You will not be able to trace it," says General von der Goltz. So that scarcity of provisions would in Europe present grave difficulties as regards transport. I have already treated this question, and I shall add only a few words. The protection of the railway lines in France presents infinitely more difficulty than it did in Africa, owing, on the one hand, to the nature of the country; and, on the other, precisely to the density of the population, which will be absolutely hostile as a whole, and not, as in South Africa, only partially hostile. As regards distinctive uniforms, when the guerilla warfare begins they will probably not exist. There is no doubt that khâki, or some similar material, will impose itself by the force of things. After some months in the field there will remain only a vestige. In a Continental war everyone

will have passed through the ranks, and all will have a right to wear uniforms. As on sea letters of marque are given, so on land; the Governments will probably issue certificates which will protect the reservists. The reprisals made in 1870 upon the civil population cannot be made at present, in view of the mass of reservists, and in any case the defender would not have much more to suffer than the attacker.

In regard to what Admiral Bowden-Smith calls a conclusion which is rather a favourite idea of mine, that Regular Armies and trained men are not necessary, I am afraid that I cannot have expressed myself clearly. I have no belief whatever that training is unnecessary. What I do urge is that present methods of training employed in the great Continental countries are erroneous, that long service is not necessary, and that such training as is given should rather be on Swiss lines. I believe that it is not training alone which gives power, and that training should be individual, and not mechanical. Of course, I am aware that this is not an original view, but the support which it has gained among actual participators in the South African War is very valuable. Sir Redvers Buller expressed himself publicly in this sense some months ago. General Ian Hamilton at a dinner only a few days ago said the same thing. I quote from the newspaper reports:—"Like M. de Bloch, General Ian Hamilton holds the view that on the trained individual, and not on the massed troops, will the victories depend in future. The day of large Armies, he thinks is past. The South African War has shown that a well-trained man, with a good eye and intelligence, is equal almost to a regiment of men who have to operate by word of command; and the duty, therefore, of all nations is to develop the individual intelligence of each combatant, and render him independent of officers in time of need."

So I am, in this respect, in good company. The Minister of War in Holland, where service is only for one year, told me that he was about to bring in a Bill reducing it to eight months. In my lecture I said that even for artillerymen three months' training was sufficient. That was the result of an enquiry made by me in France. In England a high authority, who was kind enough to give me his opinion, thought that an artillerist could be trained in from seven to eight months. Here I have two opinions: the French opinion putting it at three months, and the English opinion putting it at from seven to eight months. It is possible, therefore, that in English training superfluous instruction is given in some respects. In general, I am quite convinced that training might be a great deal shortened, especially if begun in the schools, and otherwise practised as in Switzerland.

With regard to Sir John Colomb's interesting remarks, I should like also to say a few words. Sir John Colomb says that I am mistaken in thinking that you are about to carry out radical reforms in your Army, and he points out that the changes have much less significance. I am very grateful for Sir John Colomb's correction. My error arose from the fact that during the introduction of the Army Bill remarks were made by Mr. Brodrick which implied that the British Government intended to bring in a project for conscription, if the present reforms failed to secure an adequate number of men. As to the reference to interference in a Continental war, one of your Ministers spoke recently of the increase of the Army as being partly due to Continental obligations. But this point has no bearing upon my arguments, and I shall not therefore say anything more about it. In Sir John Colomb's discourse are found also some remarks as to the difference between an European war and that which has taken place in South Africa, chiefly in regard to the relationship of area operated on to the force employed. In Europe we shall have millions of men, while in South Africa only 350,000 men were in the field. I dealt with this question at length in my first lecture, and again in my reply to Admiral Bowden-Smith. I shall, therefore, only say a few words. It is quite true that the forces in Europe will be nearly thirty times greater: but how this would operate I pointed out. It would result in difficulties of leading, manœuvring, and provisioning, and would lead to economic perturbations. But, as concerns tactics in battle, the number plays no *rôle*. The millions will be broken up into many armies; and, therefore, it is quite possible to draw lessons from the experience of 350,000.

Sir John's remark that the difficulties in South Africa are analogous to the commonplace difficulty of finding needles in a bundle of hay does not seem to me altogether just. At the beginning of the war and up till the beginning of the guerilla warfare the Boers were massed in limited districts, and their invisibility did not arise from the area of the country, but from new conditions of battle. He also thinks that history tells against my argument as to the impossibility of war, and he points out that though such ideas have often before been held in the course of the present century they have been always disappointed.

But in my lecture I gave reasons for believing that the lessons of military history must be changed to-day, and as I have heard no refutation of my arguments I must continue to hold them. It is quite true that hopes of peace in the past have been disappointed, but these hopes were very different from mine. They were based on humanitarian sentiment, and they relied upon human progress in morals to prevent war breaking out. My argument is a very different one. I know that, unhappily, war may break out any day, and I have no delusions on that point. When I say that war is practically impossible on the Continent of Europe, it is not because I put any faith in the desire for peace. The basis of my argument is that under the military, social, and economic conditions of Europe at the present day, though it is quite possible that war may break out, it is almost impossible for it to be waged successfully; and that in any case, it must be waged in an entirely different way from that of the past. But with this latter point I think Sir John Colomb agrees.

Sir John Colomb refers to the question of invasion, and he asks, "If frontal attack is impossible, how are you going to attempt to land a great invading army on boats and rafts?" Sir John says it is impossible, and I entirely agree with him, and have always said that there is no danger whatever of a successful invasion of England. He in turn agrees with me that the great difficulty in England would be the maintenance of her food supply. But he does not think that the problem is hopeless, and he makes the very interesting remark that in maritime war a great moral effect is produced by a superior force. He says:—"It is the possession of sufficient battle-ships, cruisers, and observer forces, exercised by a superior force, that produces the moral effect that keeps the enemy in port."

I should like to give my reasons why I take the liberty of differing from such a high authority as Sir John Colomb. I agree entirely as to the moral effect of superior naval forces. The question is, How will that moral effect operate? My own belief is that it will operate very strongly in keeping the enemy's battle-ships in port, and making him refuse to risk battle. But the question of protection of commerce is a very different matter. Because when dealing with a superior force the weaker side must do something, otherwise there would be no use at all in having a fleet that was not superior to the enemy's. We know very well that the British Fleet is superior. But it is for that reason that France, Germany, Russia, and Italy pay every year millions in subventioning commercial ships which may be turned into cruisers. Does Sir John Colomb imagine for a moment that these will remain in port owing to any moral superiority of the British? I admit, of course, that the British Fleet can destroy them, but it will be only gradually. And surely it is in this very war upon commerce that the weaker side will seek his recompense. The war upon commerce will be the result of inferiority—it will be the weaker side's protest against the superiority of the stronger. It is owing to this very fact of the moral superiority of a greater fleet that commerce destruction will be begun. The moral superiority of larger forces also exists on land. But when the larger armies have established their superiority, what do the weaker do? They employ their energy not in fighting, but in capturing convoys and small detachments. It is precisely so at sea. It is because the weaker side cannot fight that he turns to a war upon commerce. Moreover, the moral advantage of a larger fleet will not be feared by a nation possessed of swift and powerful cruisers against which battle-ships are useless. In such a war speed determines everything, and in a war of commerce a weak nation which can put upon the seas a single cruiser which can steam one knot quicker than any of the enemy's ships may come out victorious. Therefore, with all

respect to Sir John Colomb's high authority, I must retain my opinion that the protection of England's commerce will present great difficulties in time of war.

Sir John Colomb's optimism seems to me extraordinary, and I can only ask myself how such an eminent man with such a penetrating mind as his can believe it possible to avoid the catastrophes which threaten England in case of war, merely by means of a greater or less number of war-ships. Do we not here witness the morbid phenomenon which the German Chancellor Caprivi characterised as the *folie des nombres en fait d'armements?* In view of such optimism, it is not improbable that if war were to break out to-day we should find the same phenomenon as was witnessed at the beginning of the South African War when it was believed that some £10,000,000 and 70,000 men could conclude the war. I ask Sir John Colomb to excuse the comparison, which of course can only be justified to a certain point, as Sir John himself says that the real danger of England and of the British possessions lies on the sea, in the economical question, the protection of commerce in time of war. But we have had infinitely greater warning than we had at the beginning of the Transvaal War. We see another distinguished officer, Admiral Sir N. Bowden-Smith expressing the apprehension that the fear of popular movements owing to the rise in prices is not without foundation. We have had a Committee, thanks to the initiative of Mr. Yerburgh, M.P., which has undertaken a serious study of the question, and which came to the conclusion that it was indispensable to have depôts of Governmental grain to feed the population. Captain Murray in his lecture shows how narrow are the limits of the purchasing power of the poor, and how great is the number who would have to be supported by the State, and he proposes, in order to avoid tremendous catastrophes, to provide stores of provisions in time of peace; and in time of war the establishment of a state of siege in the whole Kingdom which would make it possible to feed the population by the distribution of sufficient food to prevent death from starvation. In the discussion which took place on this lecture, a discussion in which sailors, soldiers, economists, statisticians, and manufacturers of eminence, took part, it was certainly shown that the position would be most critical. Captain Murray thinks that England's food supply might possibly last for four or five months, while other experts, like Mr. Seton-Karr, M.P., think this is too favourable a view. But the question is not merely how much food is to be found in England, France, or Germany, at any one time, but also whether the rise in price which would take place on the outbreak of war would not put that food entirely out of reach of nine-tenths of the population. Mr. Seton-Karr reminds us that by the artificial measures of a single brain - that of Mr. Leiter—the price of grain in this country was put up from 25s. to 40s. per quarter, and he well asks what would happen when war conditions begin to operate. The answer to that question is given by Mr. Seton-Karr, who cites the case of the Spanish-American War.

"When that war broke out, Spain never raised a finger to interfere with any American ship, never attempted it in any way, never sent a torpedo-boat or a tug-boat out. But in the early days of the war there was one large American sailing ship, the 'Shenandoah,' with, I think, 30,000 centals of wheat consigned to Liverpool. She was on her way from San Francisco, and was somewhere off Cape Clear soon after war was declared. There was a Spanish torpedo-boat damaged by a collision or gale, which had put into Haulbowline to be repaired, where she was repaired by our people. Well, the 'Shenandoah' was something like two days overdue in Liverpool, which everyone knows is nothing for a sailing ship. The rumour was started in Liverpool that she had been picked up by this torpedo-boat, which was well known was comfortably in dock at Haulbowline unable to move. What was the result? In one afternoon the price of corn in Liverpool jumped up nearly 50 per cent.!

"Such was the effect of a mere impossible rumour. What would the effect have been if the 'Shenandoah' had really been captured? And what would the effect be in a future war, when not one, but every grain ship crossing the Atlantic, was in danger of capture?"

The lecture of Captain Murray and the discussion which followed give lessons not only for England but for nearly all the world, for the conditions of England in regard

to food supply are reproduced to a large degree in all the countries of Western Europe, and it is not only England which is threatened with famine as the result of a naval war and land war combined. I pointed this out in my book years ago, and now I have only to say that nearly every point stated in Captain Murray's discussion, such as insufficiency of home production, smallness of store of food at any one time, great rise of prices in time of war, and probable result in inciting to disorder the industrial populations, will apply also in the case of a French and German War (and this even though oversea communication should be maintained), owing to speculation, difficulties of transport, and lack of men and horses for home production. The fact that France and Germany have land as well as sea communications has the effect of putting this fact into the background in this country; yet it is true that both these nations in time of war would be as absolutely dependent on oversea communications as England. Russia and Austria are the only great Continental countries which produce a superfluity of grain. Now in time of war Germany will get no grain from Russia, and hardly any from Austria, and France can only get it by sea. In other words, both France and Germany are dependent on sea communications for their food supply, and their position differs from that of England only by the fact that England's industrial population is somewhat larger, and her products of grain smaller. It is a difference of degree and not of kind.

But this consideration gives to Captain Murray's lecture an enormous importance. For when I read his paper I found that practically all the members of the Institution who discussed it, agreed that it would be quite impossible to prevent scarcity of grain and an enormous rise in price. Yet England's fleet is the largest and best in the world. What then would be the case of Germany in a war with France and Russia? She has a narrow seaboard and a small number of ports, and against her would be a French fleet on one side and a Russian fleet on the other. If England with her enormous fleet, her immense seaboard, numberless ports, and great merchant marine would be exposed to famine owing to a rise of price in time of war, would not Germany be in a much worse position? And would not her position be complicated still further by the fact that the tillers of the ground, and the artisans and labourers would be summoned to the colours, a fact which has no parallel in a British naval war?

These are the reasons why I must retain my opinion as to the economic perturbations which would be the result of a great war.

If I were to sum up all the objections which have been brought against the contentions in my lectures, I could only say that their effect does not make any change in my views. This, in spite of the measures taken to give opportunity for argument, such as the distribution of the two lectures to the members of the Institution, and also the distribution of a *questionnaire*, in which all the main points were set plainly forth. I do not think the essential questions have been touched.

I would repeat again, in order to avoid misunderstanding, that my aim has been purely scientific and in no way political; the problem of the prolongation of the South African War, its probable results, and the policy to be adopted have been as far as possible avoided. And that my work, thanks to the great hospitality which you have given me, has not been useless is proved by the zeal which certain partisan or interested German journals have displayed in distorting the facts of the Transvaal War, in order to prevent the lesson being drawn that a war between the Great Powers would be disastrous and sterile. Every explanation of the difficulties arising from the new conditions of war is represented as arising from animosity and hatred. We are here face to face with a very serious symptom, and in the interests of humanity and of England, it is very desirable to find a remedy. This can be done by you, if you throw light on the changes which have taken place in the conduct of war, by setting the lesson before the eyes of everyone. I ask your indulgence for a moment longer in allowing me to explain what I mean by this.

From the discussion which has taken place, we saw that each member stood primarily for the defence of his own arm. This is, of course, most useful from the specialist point

of view ; but it suggests other reflections, that is—how difficult it is to find anyone who will take a comprehensive view of the whole subject of war, not merely in regard to the co-relationship of the various arms, in the strict sense of the word, but also in relation to those financial and economic resources, without which the continuation of a war long enough to obtain decisive results would be impossible. I think myself, and have long thought, that the *ensemble* and philosophy of war is a subject in which every nation needs to be educated. The political histories taught to children, and the military histories studied by specialists, throw no light on this problem. Nowhere do we find any clear notions of what war is as a social phenomenon, or even in the *ensemble* of its details. But war is not merely a series of military operations, but a great social appearance which has its ramifications in every branch of life, and the consequences of which are every day being absorbed as integral parts of the history and evolution of every nation.

Now, to deal with this science no method has ever been created. In England, and elsewhere, we find museums, such as the interesting museum attached to this Institution, which deal either partly or wholly with war. But these museums are mainly historical; their chief object is to preserve objects of accidental interest, and they neglect altogether the exposition of war and its social phenomena to-day. It is the same in military exhibitions. In London at the present time you have two of these, but both are spectacular and formed for amusement and to satisfy curiosity. Neither from museums nor from exhibitions of this kind can you learn anything as to what war was in the past compared with what it is to-day. I have studied in many museums and exhibitions, and I have always been struck by the fact that, as if intentionally, every object showing the changes which have taken place in war has been, so to say, hidden, even when chronological collections are shown. A soldier perhaps, by sacrificing much time may extract from them a little light ; but the ordinary mortal, never. Once only, at Buda-Pesth during the Exhibition, I saw a small military section which dealt with the subject in a scientific light, and my own experience of it was that from this collection it was possible to learn more in a few hours than from the study of books for years. I watched the impression created upon the general public and saw what great value such optical teaching had for the cause of peace. That is what is wanted. Its use is not only for the ordinary public, but for statesmen also.

We have heard here the complaint that statesmen refuse to grant credits for the most indispensable military needs. But that naturally arises from the fact that money is every day demanded for fresh improvements which cost millions : the argument being always the same, absolute necessity. Before these credits are exhausted more money is demanded for throwing into the gulf—a new invention, a new improvement must replace the old. But if the elements of the mechanism of war could be easily studied, many of the frivolities, let me say many of the manias, which cost millions, would be avoided. Even for soldiers such an institution would be of great use. The military man is an artillerist, an infantryman, a cavalryman, an engineer, but the *ensemble* escapes him. The science of war changes every year. The higher grades of officers learnt the elements of the military art long ago, a colonel perhaps 25 years, a general 35 years ago. Do they keep their knowledge up to date ; have they time for it ; and can they do it, as they often have to, only by the dead letter of books ? The younger officers have learnt more, and have studied models in the schools. But they dare not give an expression of opinion, which would not help them in their careers, but must keep silence. That is why even for soldiers a lesson might not be without use. But above all, what we want is to show to soldiers and civilians something of war as a whole, with a representation of its technical, economic, and financial sides. I may say that my conviction as to the importance of such study is in no way new. After the beginning of the South African War I declared in the *Daily Telegraph* that the lessons which the war would teach would be of the first importance, and that as they would probably be distorted, it would be useful for the British Government to send to South Africa trained specialists, who would have nothing to do but to study the phenomena of war

on the spot, and afterwards draw up reports from which a general conclusion could be made; and if the Government did this, I expressed my willingness to meet part of the expenses.

Now, if such a measure had been taken, we should have had much better and more ordered material than we have to-day; and a representation of the South African war in a scientific and popular manner, which would help, among other things, to refute the accusations of incapacity brought against the British, would present no difficulties. You are all, though soldiers, friends of peace, and therefore I have no hesitation in saying to you that such a course of popular study would be of immense value in preventing the outbreak of wars. As Lord Salisbury said, it is no longer the Governments, but the peoples, who make wars. But if it was necessary that Governments in the days when they made wars should know something about war, and did they ever know enough—witness the French Government in 1870, the Russian Government in 1877, and the British Government in 1899?—surely it is also necessary that the people who now decide the issue should be at least equally instructed.

The object-lesson created by a scientific museum of war would prove of great value for the world's peace, and also for England. But another motive not of less importance pleads for the creation of such an institution in England; that is, that it would to some extent teach civilians something of the art of war. Whatever else be disputed, it cannot be denied that the Transvaal War shows what excellent soldiers civilians may prove themselves to be. We all know what the Boers did, and we see that they showed their superiority even in the scientific side of war, such as entrenchments and fortifications. This is not because the Boers had no training, but because each used his individual intellect. Yet the Boers had their defects. The United States attaché, Captain Reichmann, said that although still fine shots, the Boers are no longer such excellent marksmen as of old. They are still hunters rather than soldiers, and will not hold a position to the last. Their most serious defect was the lack of military discipline. When a movement was proposed which was not agreeable to the men, no officer would make a move, consequently many well-planned affairs were ruined. Politics play a great part in the election of officers. Inferior officers act on their own initiative to a degree which almost passes belief.

England might have a national army in which the defects of the Boers would be corrected; but their good points, individual initiative, and capacity for adaptation to new exigencies of tactics, preserved. We are told that at the schools the methods are right, but it is necessary very often to instruct the instructors; and it is necessary to awaken public interest in the science of war. For these reasons an institution such as I have sketched is indispensable for England. The Government itself might create it, but there is reason to fear that this might result in the distortion of the technical side and the suppression of the economic side. It seems to me, therefore, that the Royal United Service Institution might take the initiative in creating the institution of which I speak. I do not believe that there would be much difficulty or any risk. You would find many men who would labour willingly in such a work. I have already myself taken the initiative abroad by founding a Museum of Peace and War in Lucerne. For years past I have been engaged in the study of how best to present at once scientifically and simply, all the questions involved in war. The materials are ready, and you may see on these walls some specimens which show the general idea. For the special section, which is a representation of the differences between the phenomena of the South African War and those of former wars, I have elaborated a programme which I propose somewhere to publish. There may be defects in this, but *la critique est aisée*, and you could easily correct and improve my work. But in any event you would do much better than I; and particularly in regard to the South African War you are in the best possible circumstances. The high position occupied by your Institution is an especial reason why the initiative might be taken by you. My own belief is that the execution of such a project would not be very costly, and I calculate that some £10,000 would cover the expenses, especially if your Government would co-operate by lending objects and new instruments of warfare,

which could be returned, if required, at a moment's notice. In regard to the locality, the building of the Royal United Service Institution would be admirable if it were not that enough space could not be obtained, for it would be necessary to represent on a large enough scale different methods of warfare, such as entrenchments. My own belief is that with a small entrance fee, a fair interest would be paid upon the capital, and a further profit brought in which could be employed towards increasing the stock of objects, and keeping the Museum up to date, such being an essential feature. In conclusion, I may say that if such a Museum is founded, I should be very glad to present copies of all that I have had made for the Lucerne Museum. I need not say that controversial questions should be avoided, the only object being to show war as it has been in the past and as it is to-day.

I will only add a few words for those who think that this proposal is not in accordance with my own desire, which is to avoid the outbreak of war, and to find other means to solve the disputes of nations. What I should say is that the greatest enemy of these peaceful tendencies is ignorance, and an institution with the objects of which I have spoken would be the best means of combating it.

The CHAIRMAN (Major-General Sir J. F. Maurice):—In accordance with our usual practice, it is now my duty to sum up the discussion, and to say a few words of my own to draw it to a conclusion. I quite agree with M. de Bloch as to the great importance which is to be attached to the first speech which was made to us by Colonel Downing, speaking as an artillery officer; because, as M. de Bloch says, the possibility of the attack of infantry upon infantry must necessarily be largely determined by the question whether artillery is or is not able to keep down the fire of the defenders. So much is that the case, that I think M. de Bloch will agree that if the proposition put forward by Colonel Downing was proved, M. de Bloch's case would break down, because his whole position is that the defence of infantry against infantry has become as powerful, and artillery has become so ineffective in acting against infantry, that practically the defence is supreme. Nevertheless, I do not think that Colonel Downing has taken the strongest illustrations from the war that he might have done. His allusion was to a particular incident which he had himself seen as an illustration of this proposition that artillery is able to keep down the fire of infantry as a preparation for attack. A much stronger instance that might have been taken was that of Pieter's Hill, where, not by the saying of the artillery at all, but by the common consent of the Army of Natal, "Ladysmith was relieved in twenty minutes by the fire of ninety guns," which simply meant that the infantry fire of the defence was so kept down that that magnificent attack of the infantry—of which we all know—could be carried out. Therefore, as regards the question immediately at issue that makes a very much stronger point than the minor incident of Reitfontein to which M. de Bloch objected. But, to my mind, a still stronger case is that of Paardeberg itself, because it illustrates precisely the misunderstanding about the use of artillery in such matters, which is apt to arise. It is quite true that the artillery at Paardeberg produced exceedingly small loss upon the Boers, immediately by its own fire; but what the artillery did do was to keep them down in their trenches, enabling the enclosure of the infantry to be made at such close range round them as ultimately to produce the surrender which was fatal to the Boers. I quite admit all that M. de Bloch says as to the difficulty of artillery acting against trenches under such circumstances, but if the result is that you shut up men like rats in a hole, it is about as good to you as if you killed them on the spot, as far as the effect in war is concerned. That brings me immediately to Sir Howard Vincent's speech. I hope he will not think it unkind of me if I say that its value almost entirely depends upon the assumption that what Sir Howard Vincent did not know before the beginning of the war was not knowledge. That is an assumption which I might admit, considering the great pains and care which Sir Howard Vincent has taken to inform himself, but for one little incident which I must now make public. Sir Howard Vincent a year ago, at the time to which M. de Bloch has alluded, put forward identically word for word the same challenge that he did at the lecture

here the other day. He said, "I should very much like that those people who say they knew these things before the war would produce the books in which it was said before the war that the losses from artillery would be as small as we have found them to be." Ten minutes after that lecture was delivered I went up with Sir Howard Vincent into an upper room here, and I put into Sir Howard Vincent's hands an extract from a volume as to which I venture to say that, if Sir Howard Vincent had never heard of its existence, he was almost the only man in these islands that had not done so. Thanks to the enterprise of the *Times* and the *Daily Mail*, there is one voluminous work which it must have been very difficult for anybody not to have been aware of. I suppose you each of you have had, as I have, some advertisement of the *Encyclopædia Britannica* before your eyes nearly every day during the course of the last year. At all events, a year ago I put into Sir Howard Vincent's hands a passage in the article "War" in that book, written at least ten years ago, in which it was urged as a conclusion from all our previous experience that the result of artillery fire, despite its enormous development, would be to produce comparatively few direct losses in battle, that is to say, that when you add them up at the end of the day, the dead reckoned to the guns would be comparatively few, not because artillery does not produce deadly effects where it strikes, but because the great ranges at which it fires enables an enemy to avoid the area of its destructive effect. Notwithstanding that, the argument, as you may see it if you please, was that that did not alter the fact that the power of artillery was greater than it ever had been in preparing the way for the action of infantry. Provided always you are able to keep down the fire of the enemy, it does not matter to you for military purposes whether you then kill them or do not. You want to seize a certain position, and in preparing the way for that artillery is just as well able to do its work as at any time. I put that into Sir Howard Vincent's hands to bear out my statement that that was there predicted at least ten years ago, and was a then accepted fact. I do not think, therefore, that it was fairly open to him to put forward his challenge again a year afterwards. I think I could, if I may venture to say so, go through almost all the forty points to which Sir Howard Vincent has alluded and show that the same principle applies. They are not new, and M. de Bloch does not claim that they are so. He has quoted from able soldiers of all nations proof that these things had been foreseen, and that the war has justified the conclusions which those who had carefully looked into the matter had previously drawn. I honestly know of no single circumstance that has occurred in this war which does not stand exactly in the same relation to previous experience as this question of artillery. The general public thought that artillery must kill a great many men in battle, and the result has been contrary to their expectation; but those who had gone a little below the surface did not think so. They did think, nevertheless, that artillery would produce that effect which is of importance—that if the Germans were going to break across a position, they would do it by an overwhelming artillery fire and by turning movements in correspondence therewith. The question of the value of the deductions which M. de Bloch has drawn from the great catena of military authorities whom he has consulted is so important, that I shall interrupt the course in which I am following the different speeches, in order to turn to an interesting incident in the past history of this institution which will throw a rather peculiar light upon the whole subject. I have before me a copy of the JOURNAL of the United Service Institution thirty years old. It contains a lecture by one of the ablest men we had in those days, a professor of fortification in the Staff College, "On the advantage which the new arms of precision give to the defence over the attack." That was just previous to the great Franco-German War of 1870. It was a very ably drawn-up anticipation of very much what did happen in the 1870 campaign as far as the actual effect of weapons was concerned. It so happened that there was present at that lecture a civilian, not nearly so eminent a man as the distinguished lecturer who has done us the honour of coming here, but one who was not unknown in his day, Mr. Edwin Chadwick, C.B. He drew from that lecture a conclusion exactly identical to the one which M. de Bloch has drawn from his vast collection of soldiers' statements

about war—that the defence of a great country was then so easy, that it was a crime for France to maintain so many soldiers as she then did, because 100,000 soldiers, with the assistance which her population would certainly give her, were so amply sufficient for her defence that it could only be for the purpose of aggression that Louis Napoleon was then maintaining the vast Army which he had. Of course, it takes some time for our papers to circulate at the Institution; people have to correct their speeches; and, as a result, that lecture, which was given in the year 1870, in a time of profound peace, did not reach the hands of the members of the Institution till after the date of the battle of Sedan; by which date the whole of that enormously too-powerful Army was virtually *hors de combat*, and the Germans were marching irresistibly upon Paris. Mr. Edwin Chadwick did just what M. de Bloch has done. He took the words of soldiers about detailed incidents of war under its then conditions. In the main, the statements he had quoted proved to be true and accurate. He deduced from them the false conclusion that France was enormously over-strong just immediately before the time when she was crushed within three months under the heel of Germany. Therefore I think it is possible that in any studies that may be made in that sort of way—which have been so admirably done by M. de Bloch, these which are so valuable in their extraction of the thoughts of the ablest soldiers of the time—it is just possible that a somewhat similar miscalculation may be made by M. de Bloch. I quite admit with him that things have enormously changed since those days, that the development of weapons has been even greater between 1870 and the present day than it was between Waterloo and 1870; but if it was possible for an extremely able civilian to extract from the conclusions of soldiers, in themselves correct, a statement so completely erroneous as it was immediately proved in practice to be, I think it is just possible that M. de Bloch's use of the soldiers' language may equally lead up to a conclusion which will break down on trial in war. I think the error lies largely in the same misunderstanding; for what happened in that case has, I think, been proved to have happened in the South African War. The reason why the Army in France in 1870 passed almost to the last man, the last horse, and the last gun into captivity in Germany, was that the invading Army made use of the increased power locally of the defensive. By means of it they encompassed the French Army in Metz and Sedan in a ring through which the French could not break. In other words, that enormous power of the defence was by the skill of von Moltke, turned into one of the most effective powers for the conquest of the country that could possibly be devised. Similarly, the skill which Lord Roberts displayed in his great march upon Pretoria lay in the mode in which he utilised that enormous power of the defensive of which M. de Bloch speaks. He saw that in the case of an enemy then trusting wholly to the defensive he could safely leave men at twenty paces distance to hold back the Boers. That enabled him to give a vast extension to his force, and gave him an over-surplus of troops for throwing round on the flanks and so out-manœuvring the Boers. Therefore, I think the conclusion is a fair one, that with a proper application to circumstances in the great struggles of nations, the tactical difficulties of attack may be turned to the advantage of invasion under the present conditions as they were turned in the past, but in an enhanced degree. I return now to the speeches. I leave for a moment Sir Nathaniel Bowden-Smith's most valuable and important speech, because to my mind the most striking thing that he said touches the crux of the whole question; but as it lies outside of my immediate tactical subject, I venture to pass on to Colonel Graves, who dealt with the cavalry. All that M. de Bloch has said may be perfectly true as regards some of the detail of the criticism that he has offered in reply to Colonel Graves, but I think we cannot, any of us, forget the cry of indignation that was raised against the expression "dismounted men preferred." There has been so strong a feeling throughout the country that mounted men were a necessity, that I think there are a good many of us who are inclined to agree with Colonel Graves that had 70,000 mounted men been sent out to South Africa in the earlier stages of the war, we should have had a very different scene from what we have had in the actual war. I may venture also to say that two of the most brilliant

episodes—I do not think they were those which Colonel Graves mentioned—of the war were actual cavalry charges, the one that of General French in the march to relieve Kimberley, which was a decision of the moment, quite as completely a sudden cavalry move as any that was ever made in war, in which he broke through the Boers and succeeded in forcing his way when nothing but a cavalry charge would have done it; and the other, curiously enough, on the opposite side by De Wet himself, who, though he had no proper cavalry, yet did use his men as cavalry in the proper sense of the term at the time when he broke through all our toils thrown completely round him, and when we thought we had him completely netted, did, by an absolute charge, riding as hard as he could go, get right through our lines. Nor can we, any of us, forget how during that anxious time which preceded the arrival of Lord Roberts in South Africa, it was the news which we received from General French and his cavalry force round Colesberg which alone relieved the gloom. I am, therefore, from these experiences not inclined to think that, even with regard to those parts of the cavalry action which are most doubtful, it has yet been proved that the day of cavalry is gone. It is to be remembered that very much the same conclusion, that the day of cavalry was over, was drawn after the 1870 campaign, and that as a result of it at the end of the war von Moltke enormously increased the German cavalry. Therefore, I think, that we should not be in too great a hurry to accept the conclusions of the lecturer as to the incapacity for their proper work of either artillery or cavalry. A question was raised, both by Colonel Graves and by Sir John Colomb, which may be summarised as that of the four-pound loaf. I remember, and there must be a good many people in this room who also remember, a time when Lancashire was starving because all our cotton had been cut off by the blockade of South America, and that Lancashire nobly bore the starvation: she was helped, as she was bound to be, by the rest of England, but not a mob was anywhere found and not a house was robbed because our men had to go short. For my own part, I believe in our people. Where they see that we are engaged in a great cause, their hearts, as they have shown us in this war, are in the right place. I do not therefore believe that we have anything to fear from internal commotion at a time when we are struggling for our existence. Further, I think that the point with regard to the danger of our being starved into surrender has been a good deal too much pressed. No doubt it is one of the difficulties against which we have to provide, and we have not failed to provide against it. There has been a great outcry in some quarters as to our shore fortifications—I am afraid I shall not carry Sir John Colomb with me in saying so—but as a matter of fact, every fortification that has been made on land within any time that I can remember, has been made on the advice of the Admiralty, not of the War Office. That is especially true of the two great fortified ports in Ireland at Lough Swilly and Berehaven. They were designed as harbours of refuge for swift ships coming across the Atlantic. Many other precautions that I might mention have been taken to meet this very danger. As long as the whole subject is carefully considered and provided for beforehand, I for one cannot doubt that as long as we want food, and are able to pay for it, we shall be able to get it from outside. Sir John Colomb touched on one point which has not been alluded to by M. de Bloch; it is of very considerable importance. He said, that the war in South Africa was not a happy one for M. de Bloch to take as an illustration of the difficulties of a Continental war; because our one difficulty in Africa has been the enormous extent of the area with which we had to deal. It was, as he happily said, the difficulty of hunting for a needle in a bundle of hay. That difficulty will not arise in Europe. The difficulty that M. de Bloch himself foresees, is that the area of Europe—to take a specific instance, the common frontier of France and Germany—is so restricted that in proportion to the enormous number of men that are available for defence or attack, the difficulty will not be that of finding the needle in the bundle of hay, but that of finding room for a needle to penetrate through the mass of fortifications and armed men that will be arrayed. So that the analogies do not apply. With regard to the long period through which the war has continued, I cannot for the life of me see that it has been in any sense whatever due to the development of

weapons. The story of the Tyrol or La Vendée, the story of the Austrians in Bosnia, the story of Spain against Napoleon, all show, not that a civil population could then any more than now win against an Army, but that it could for an indefinite time, if it was ready to make the frightful sacrifices which such a resolution entails, delay the final settlement of the war. So far as I am able to judge, I can see no single one condition of the present state of war which does not enhance the difficulties of the civil population and increase the facilities of the dominating Power. The whole power of the railways, of telegraphs, all the enormous necessities of ammunition and of modern weapons in all shapes and forms, the enormous development of engineering work, the work we have been able to do in South Africa in rebuilding bridges and many similar works, are all in favour of the dominating Power and not of the population. M. de Bloch speaks against himself in that matter when he says that mere armed police will be sufficient to control anything in the nature of an insurrection of the population. If that be so, surely then the mere insurrection of a population will not be a more serious impediment in our times to the march of an Army, than it has always been in all times, so long as the population was ready to fight for its hearths and homes. When M. de Bloch speaks of the cruiser question and quotes the well-known story of "Russia's Hope," we may simply appeal to the elaborate, exhaustive, and most eloquent study which has been given to that subject by Captain Mahan. He has absolutely, as far as I am able to judge, demonstrated that *guerre de course* may be a very inconvenient thing, but as against a dominant naval Power it will be a mere flea-bite as compared with the destruction which the naval Power is able to inflict. I cannot see that there is any answering what he has said on this subject. M. de Bloch says that plains yield better ground for defence than mountains. In so far as that means that it is much more difficult to advance against a fortification across an open plain than up a broken hill-side with much dead ground, there is no doubt about it. The whole history of wars tells us that; but mountains do not necessarily relieve you from that difficulty. Our greatest difficulty at Colenso was in the fact of the Boers being on high ground, while we had to advance over an open plain, so that our difficulties in this very war have been of the nature of which M. de Bloch speaks. On the other hand, where you have a very extensive plain as we had in the Orange Free State, it gives facilities for making turning movements such as are decisive in their action. I pass on to that remark of Admiral Bowden-Smith, which, as I think, represents the crux of the whole question. Admiral Bowden-Smith spoke of the causes of war, and he showed that what really determined war is not nice calculation of what we are going to lose or gain, but those terrible differences which occur in the points of view from which different nations regard the same events. I do not think it would be possible to illustrate that more perfectly, or to show that war is certain in the future, than M. de Bloch himself does in that interpretation which he himself puts upon the South African War. He is entirely, most loyally, honestly, and thoroughly convinced, I am quite sure, that the war in South Africa was a pure war of greed. I am just as certain as I am of my own existence that the war in South Africa was one, so far as the view of the English nation as a whole was concerned, of our national existence; one in which we believed, rightly or wrongly, that there were certain English colonists who were being deprived of their just rights, and being treated as pariahs because they were Englishmen, and that it was a question for us either of protecting that colony, or of every colony being lost to us. Whilst I have no power whatever of shaking M. de Bloch's belief that it was a pure war of greed, I want to bring home to you the obvious inference to which that conviction of his leads as to the certainty of future war. It happened to be my duty some years ago to draw out, as an official publication, a study of the origin of all the wars of the past from the year 1700 up to the year 1870, and so far as I know, the story of the origin of every one of those wars is represented by that difference of mind between myself and M. de Bloch. Every one of them arose from the difficulty of men of one nation putting themselves in the place of those of the other. I say that if the nations of Europe believed that we were purely as a predatory nation engaged in this war,

they were bound to do everything they could to oppose us; and that we, being absolutely convinced that it was for us a question of "to be or not to be," were bound equally, whatever they might do, to go into it. No risk of such losses as those with which M. de Bloch threatens Europe would have in the least deterred us from entering upon the war. Rather than that we should have deserted our brother Englishmen beyond the seas—

> Better the waste Atlantic roll
> On them, and us, and ours for evermore.

TYPHOID, THE DESTROYER OF ARMIES, AND ITS ABOLITION.

By LEIGH CANNEY, M.D. (Lond.)

Tuesday, 12th November, 1901.

Sir WILLIAM H. BROADBENT, Bart., K.C.V.O., M.D., F.R.C.P., F.R.S., in the Chair.

IN asking your consideration to-day of a scheme which I have proposed for the prevention of one of the greatest evils in war, I am encouraged to address this meeting of experts, feeling confident that you have assembled here in the public interest, with a desire by your counsel to assist the nation to avoid in the future the recurrence of those evils it has lately suffered and may shortly be again called upon to face. I feel confident that, if you are of the opinion that the scheme I shall propose is likely to lead to a marked reduction of these evils and the disasters that have often accompanied them in the past, and if you regard the organisation and effort involved to prevent the same as reasonable and practicable, you will not allow yourselves to be moved from the resolution that in the public interest this scheme in its essential principles shall be carried out. Without actual military experience, but with considerable civil experience in the successful prevention of these same evils in the vast camps of European and native workmen employed upon the great barrage works of Egypt, I have taken the initiative in this movement, as I have observed that those actually engaged in the administrative work of our Army and officers generally, feeling themselves part only of an intricate machine, hesitate to make proposals involving radical changes which too often meet with signs of active disapproval and hasty rejection. Hence arises a strong inclination to allow theories which are antiquated to remain in force, reforms which may meet with any opposition to be left un-urged. Inertia reigns supreme. The intelligent officer, fast bound in chains of discipline, rapidly succumbs to the inertia, disturbed only by occasional impulses of "I would that my tongue could utter the thoughts that arise in me."

New methods often involve departure from accepted traditions, and too often are met with a prompt "impracticable" or "never," a reply which really represents only the "personal equation," or time required to absorb the idea. Such replies are an automatic function of the brain, and

only mean that the attention has not been riveted upon the subject. The same individual, after he has adopted the new scheme for some years, if asked to abandon it, would most certainly reply "never." Who would have ventured two years ago to have read in this place a paper on officers and men "seeking cover," and who now would read one neglecting "cover"? What "cover" is to the rifleman, that is "approved" water to the soldier in general. The object of war is to force upon the enemy surrender or annihilation. It is manifest that to wilfully allow oneself or one's men to be killed by the enemy's fire, or to be spending weeks in bed at the critical moment with preventable disease, before this result has been attained, is neither business nor war. The vast extent of the latter evil in this war led the House of Commons into a long discussion in which it was assumed that this evil was unpreventable, and it was induced to send out a commission to enquire if our men were comfortable with their typhoid at Bloemfontein, Kroonstaad, and other places. In that House it was stated that "In no previous campaign had the sufferings been more mitigated," as if the object of war, medically, were only to see how many thousands could be "comfortably" treated. This debate revealed a total disregard of the scientific work that has been done in the past twenty-five years for prevention, and of the serious risks to the Army that might thus follow from diminished efficiency, leading to possible total destruction, and inability to advance or to accomplish its object. The Under Secretary of State for War assumed in that debate that all that foresight, zeal, or intelligence could suggest to avoid these evils had been done. This was not the case. It is too readily assumed that, because there is a medical department at the War Office, all is done that can be done. The Medical Department have done all in their power, and have done it better than the public are entitled to expect. From the point of view of preventive medicine, however, they have been hampered by having to work on a plan which carries all the elements of failure, a plan that the very best men would find unworkable, and this the public and the Army should understand. The system of the Army Medical Department making "recommendations," which may be instantly neglected or evaded, makes it almost a certainty that they would hesitate to suggest such a scheme as I have proposed, which is essentially one liable to be sent back by the Staff. If then the view taken by the Army and the public, that the Medical Department is responsible for the terrible scenes at Bloemfontein, Kroonstaad, etc., is accepted by the Medical Department, an *impasse* is arrived at. The Medical Department hesitates to throw the responsibility for such occurrences where such responsibility actually rests—upon the then Commander-in-Chief—and, on the other hand, hesitates to promulgate the scheme that will obviate such disasters, on account of the difficulty of overcoming the passive resistance to reform, and the knowledge that the first refusal by the Staff must be regarded as final.

The result of the Hospitals' Commission then is, the reform of the Medical Service, but provides no glimmer of light as to the avoidance in future of the actual disasters which called it forth. The main issue—prevention—has been obscured. It is the object of this paper to fix

attention on the main question, that before the grass has grown over the mounds of typhoid dead we shall have resolved that these disasters shall not occur again, and that any steps taken in contemplation of such disasters-to-come, in pursuance of the idea that such disasters are inevitable, cannot be tolerated.

The great destroyers of armies in war and in peace are the diseases typhoid, dysentery, and cholera. They are mainly water-borne, and all are alike excluded by the measures to be proposed. Although there is some difference of opinion as to the relative efficiency of air and water to spread typhoid, the great body of medical opinion is in favour of the view that the main channel is water. In a paper lately read before the British Medical Association, I have brought evidence to show that if all the water avenues of typhoid to an army or camp are closed, the other avenues will cease to be effective. This was proved to be the case in the vast civil camps of European and native workmen at Assouan, and in other instances, such as in the prisons at Pietermaritzburg, Lucknow, and lately at Ahmednagar; whereas the soldiers and civil population, having access to unapproved water, suffered severely. It is on this ground that so much is to be expected from the present scheme. The Army starts free from typhoid, the primary typhoid avenue to the Army through the water is now closed, the soil therefore remains unpolluted with typhoid, and flies and dust, the secondary avenues, will remain ineffective.

These three water-borne diseases if allowed their natural incidence, as has largely been the case in the present and all recent wars on any large scale, seriously and often disastrously affect the efficiency of an army. They often paralyse an army in its movements, they embarrass the transport, produce inevitable chaos in the army hospital arrangements, and inflict enormous unnecessary sufferings, vast numbers continuing to march with the greatest distress until they fall out, and are left by the roadside.

The victims of these diseases, require careful feeding and nursing, which no possible previous preparation will ever be able to provide in war on a large scale. These diseases are all preventable during war by various methods known to medical science, yet the death rate in war from these diseases is far greater than from all other causes put together. If we take the present war, the number sent home *hors de combat* on this account is at least six times as great as those *hors de combat* from wounds.

I shall now confine the discussion to the chief of these destroyers, typhoid or enteric fever. I have shown elsewhere that the incidence of typhoid fever is a practical certainty in all wars, unless steps are taken to prevent it. I have shown that in every war in the past century where the men have drunk the water as they found it, appalling disaster has followed with mathematical precision. This enemy comes into action with concentration or mobilisation and speedily produces disaster. It dogs the army's footsteps to the end, not infrequently actually destroying the army of the conqueror. So certain is this factor, that it was fully calculated upon by the Medical Department before the present war. The appalling list of these disasters I have elsewhere cited, they are well

known to you. I wish, however, to draw attention to the effects produced by this agency on military policy.

The paralysis of an army produced by water-borne disease is often so complete, that the army fails to accomplish the work set before it. During the Civil War in England, neither of the opposing forces moved for many months on this account, though encamped in adjoining counties. From this cause, in recent times, the first army sent to the Crimea was practically wiped out by a death rate exceeding that of the Great Plague, and led "ultimately to the enforced abandonment of part of the enterprise the army was designed to accomplish." Still later, the Russians in Western Asia, had to abandon their projected policy by the paralysis of their mobilised army, produced by enteric fever. In Madagascar the slightest serious resistance would have practically annihilated the whole French army, paralysed and decimated as it was from this cause. In the present war I will draw attention to two instances in which the incidence of enteric fever led, in the one case to grave disaster and delay, and in the other case to the very verge of one of the greatest disasters that the reputation of the army could have been called upon to receive. I refer, in the former case to Paardeberg and Bloemfontein, and in the latter case to Ladysmith. In the case of the Bloemfontein epidemic, no one can deny that the delay involved in transporting all the food, hospitals, and equipment, required by a division of soldiers in bed with typhoid or other water-borne disease, and that required by their staff of attendants, must have had a disastrous effect in delaying many days the subsequent advance and the delivery of effective blows. The view taken by the House of Commons on this question, was expressed by Mr. Balfour in the statement "that the whole question is one of transport, avowedly one of transport." If this be true, then it will be seen, before the close of this paper, that there is no escape from the adoption of the scheme I have proposed.

In the House of Commons (30th June, 1900), Mr. Balfour stated: "The particular issue is, whether we are to insist that he (the general-in-the-field) shall limit the sphere of his operations, check the rapidity of his movements, dull the strength of his blow, that there shall be not a moment's delay in tending the wounded." That is the view taken by the Government and by Parliament of the Bloemfontein epidemic. The scientific, medical, and I take it military, view of the "particular issue" is that "we are to insist that the general-in-the-field shall not limit the sphere of his operations, check the rapidity of his movements, dull the strength of his blow," by neglecting to make his military arrangements so that by means of an initial minute fractional addition to transport, he shall obviate the need of this vast, subsequent, useless, but otherwise inevitable, transport.

In this particular case to obtain an effective force of 35,000 men at the objective, it was necessary to carry 500 tons of transport daily, and to have some 10,000 men in addition in hospital *hors de combat* from water-borne disease. If twelve tons more transport had been taken, which could have been obtained by leaving only a fourth part of a single hospital behind, or by employing the mules actually left behind, there

need have been no epidemic, no suffering, no delay, no dulling of the blow that would have been dealt by 45,000 effective men.

In the case of Ladysmith, not only military policy was on the point of receiving a severe check from this same cause, but national respect was on the very verge of suffering a grave disaster. General Buller has stated (10th October, 1901):—"I attacked Colenso and I failed, and having failed I had to consider the people in front of me in Ladysmith . . . . . I knew that enteric fever was endemic and was likely to become epidemic in the Tugela Valley at that time. I believed also that the Boers were engaged in putting dead horses into the water which the garrison was obliged to drink. I knew that the garrison would have trouble, great trouble, with their sick . . . . . I therefore suggested (by telegram) it would be necessary to surrender the garrison."

We see therefore, the neglect seriously to cope with the question of prevention of water-borne disease, in these cases the real enemy, has not seldom absolutely checked military policy and brought about national disaster, whilst the human enemy has often only been a passive onlooker.

Methods of coping with water-borne disease:—

I. Drinking the water as it is found. This policy, in force practically in the Crimea and very largely in South Africa, I have termed the *laissez-boire* policy. It assumes that the men are uneducated, wilful, unrestrainable, and that they will drink and must be allowed to drink when and where they like. We have seen its results.

II. There is the system at present officially recognised. This is an attempt at a compromise between supposed military exigencies and scientific laws, and is naturally doomed to failure. It provides approved water when it can, and if it fails, as at Paardeberg, Bloemfontein, Ladysmith, etc., these disasters are accepted in military circles with complete serenity as inevitable. Sometimes it provides the men with filters, which it is known beforehand may not work, and if found workable would still be absolutely dangerous if entrusted to untrained men. If the filters are absent, men are stationed above the camp, on the river the enemy has just polluted, as if their presence could frighten the bacilli descending with the water. Sometimes the men are instructed to "choose" or "look for" good water. Seeing that there is no water in war that any expert bacteriologist would venture to pronounce "free from enteric bacilli" even after long research, of what avail such advice? This system does not give due proportion to the fact that a single error in method on one occasion may suffice to paralyse the whole army.

Mr. Wyndham, in the House of Commons (29th June, 1900), asked: "Is it true that the Government went to war in South Africa without taking account of the outbreak of enteric on a large scale?" And

replies himself to this question by stating that each surgeon was supplied with Surgeon-General Sternberg's pamphlet on the American-Spanish war, and that "recommendations were made that each unit of 100 men should be supplied with a sterilising filter, and that one ton of quick-lime per 1,000 men should be laid down wherever standing camps were formed." From Lord Roberts' telegram (25th June, 1900), we may judge the state of the army from a sanitary point of view. He states:—"When we arrived at Bloemfontein we had an abnormal number of sick, due, no doubt, not only to the peculiarly exhausting nature of the march, but also terrible insanitary conditions of our camp at Paardeberg, where the only water available for drinking purposes flowed down from the Boer camp, 1½ miles up the river, which was crowded with dead animals in a state of decomposition. That this was "the only water available for drinking purposes" is no explanation of the army's being without the means of purifying it. Everyone knows that this is the kind of water you are likely to meet in war, and we could hardly expect the Boers to send it down to the camp ready boiled or filtered. Thus the army that started with some tons of quick-lime, an often unworkable filter and a pamphlet, arrived at Bloemfontein, armed for the future advance with probably only the pamphlet, which could not be expected to have of itself any marked therapeutic action in sterilising the water they had yet to meet. Is this scientific warfare? Are we to understand that these are the arrangements the Empire is to expect in its next great struggle, when the larger business may perhaps call for camps of some hundreds of thousands of Volunteers in this country, and vast English armies concentrated simultaneously, possibly in Afghanistan, Northern China, or elsewhere? Is there any military surgeon that would recommend this country to prepare for that day on these lines, and advise us to be satisfied to lay down endless typhoid hospitals that can never be worked, as some would have the House of Commons believe? Are general officers to conduct this and future wars as if nothing had happened in the medical world since the Crimea? Is the light that might be called forth from the Army Medical Department to save such disasters to be extinguished at the first glimmer? Are we to sit still and see our men struggling under ancient custom to certain destruction, and the palm for method and order pass to the soldier of the Far East or of Central Europe?

III. In the scheme which I have proposed, and now bring before you for consideration, I have endeavoured to keep the following objects in view:—

1. Certainty in method.
2. Simplicity of mechanism.
3. Continuity of action.
4. Automatic working.
5. Increased comfort of the men.
6. Diminution of transport.

The scheme starts on the assumption that all water in war is to be regarded as contaminated.

1. Certainty of Method.—I have adopted the method by boiling or heat sterilisation. This is the most practicable, least liable to errors in method, and requires less expert skill than filtration or chemical processes. This method has as advocates the late Professor of Military Hygiene at Netley, the present Medical Director-General of the Army Medical Department, and the highest medical authorities in the French and American Armies. In addition, it has met with marked success in two or three minor campaigns. The method is also more rapid and certain than any chemical method.

2. Simplicity of Mechanism.—The apparatus I have proposed consists of a cylindrical copper boiler with large heating surface below, arranged in wedge-shaped pockets which can be easily cleaned. It holds 50 pints (6¼ gallons) of water. An iron stand is provided under which a petroleum lamp is placed, with rapid and complete combustion under air pressure. The whole weighs 38½ lbs., and measures 33 inches in height by 17 inches in diameter. The apparatus is constructed to very readily allow repairing if shot through, and would be accompanied by duplicate parts, etc. Cloths would be used to strain mud from the water, but no other filtration of water would be desirable. This boiler and lamp can raise 50 pints (6¼ gallons) of water from 54° Fahr. to the boiling point in 11 minutes, consuming ¾ pint of petroleum. Cooling is effected, by covering the pint tins with cloth damped in the fluid, in 6 minutes.

I may here mention that the most practicable steriliser hitherto found of any use on service is the Waterhouse-Forbes, which weighs 29 lbs. and sterilises only 5 gallons of water per hour. There is also a later heavier variety.

The apparatus I have proposed sterilises about the same quantity of water as the best previously known in one-sixth of the time, with less consumption of fuel, and is about half the weight of the latter instrument.

One mule (carrying easily 200 lbs. weight) would transport the following supplies for the unit of 100 men :—

	lbs.
2 machines, in cases with lamps and stands -	90
42 pints of petroleum (sufficing for 4 pints of boiled water daily for each of 100 men for 7 days) and case - - - - - -	45
Sugar, tea, meat-extract, vegetable powder -	40
Saddle, 2 collapsible buckets and ropes - -	25
Total - - - - - - - -	200

Time.—In cases of urgency the men of the water section would only raise the water to 180° Fahr. This would be reached in 9 minutes, and cooled sufficiently to drink as soup or meat-extract in two minutes. To obviate delay, the time required could in most instances of urgency be arranged for, by allowing the water section to advance half-a-mile in front of the troops, but a mile and a half behind the scouts, so that tea or soup should be ready on the arrival of the troops. The morning and evening meals would always be welcome as hot tea or soup, and probably

the mid-day meal. The water-bottles and carts would be filled over night with boiled water.

The machines and fuel would be used for no other purpose than supplying fluids for the Army. All water carts and utensils used to convey water to the firing line must be under the control and care of the water section. Mules have been chosen as transport to prevent separation of the water section from the men in difficult country. The advantage to the men of being able to obtain rapidly tea, soup, etc., with their dry biscuits when the transport is often miles behind, is something which, if once established, the men would never give up.

3. *Continuity of Action.*—I have shown that there is at present no method known to science by which any specimen of water likely to be met with in war can be declared free from the enteric bacillus. As you cannot say, therefore, what part of your lines of communication may be attacked, you guard the whole extent. The water section must not rely upon the chance of finding fuel. The fuel used in this scheme is petroleum, and must be as constantly at hand as ammunition.

For an army of 200,000 men, to give every man 4 pints of boiled water daily, would require 547,500 gallons of petroleum for the year. This would cost about £16,000, and weigh about 1,833 tons. The general transport required for this army daily is 2,000 tons. This fuel would add daily about 5 tons to this 2,000 tons, or an increase of $\frac{1}{400}$.

Further, to ensure continuity of action, the transport of this water section must be made very independent of the general transport, and must march with the regiment or unit. The transport of reserve fuel required by the water section, minute as it is in regard to the total transport, must take precedence of all transport except one day's ammunition. The transport of the water section must be regarded as sacred, the amount telegraphed for must be sent instantly. No general could stop it or cut it down on any account whatever. Neither could the mules be used for any other purpose. The more difficult the country from a transport point of view, by reason of "single lines of rail" or none at all, the more urgent the need for absolutely punctuality and precision in the details of the water section transport and work, in order to effect the immense reduction of general transport that I have shown must ensue.

4. *Automatic Working.*—To ensure this system working, a system which assumes that no water will be drunk in war from the day of embarkation to the day of return which is not "approved" by the water section, it is evident that much attention to detail is necessary, and that success depends on insisting that there shall be no man in the Army who is not directly interested in the scheme and its results. In fact, every man shall look to this section for that protection which shall keep him face to face with the enemy or his work, and shall regard any departure from its protective action, either in himself or in his comrades, as an act of cowardice and likely to lead to serious injury to the Army, to his comrades, and to his country. In this light also shall the country regard his action. To reduce the number of these departures from duty

to what no one can believe will not rapidly become amongst our men—Regulars, Volunteers, colonials and naval—a mere fraction, various steps are necessary.

1. The Men.—They must understand that the scheme is a sound one and can be relied on. Just as they rely on their artillery or service of ammunition, so they may expect smartness and training in their water section in the delivery of "approved" water. They must be earnestly taught by the sanitary officers of divisions, both by literature and otherwise, the consequences in the past to armies that have neglected these precautions. They must be taught to fear "unapproved" water, in peace and at manœuvres, not only on their own account, but for the sake of their comrades who will be exposed to grave risks in consequence of their departure from duty, for the sake of their families, and the reputation of their regiment. If there are a few men unamenable to teaching, their comrades will know how to deal with them, and neither the country nor the Army will regret their loss. This supposititious minority must be made no argument for neglecting to provide the remainder of the men with the means of keeping their face to the enemy they desire to meet.

2. Officers.—All officers must be trained and examined in the elements of sanitary science, as it concerns the management of camps, disposal of excreta, technique in force for providing "approved" water, selection of camp sites, etc. They must be directly responsible for the successful administration and working of the water section in the troops under their command and for the ordinary sanitation of their camps. In the sanitation of an army they must be considered to correspond to the sanitary or executive authority of civil life. In circumstances of real stress, such as the possible failure of fuel, the water section will, with the consent of officers "approve" water available, but the circumstances must be noted and reported to the Sanitary Officer of that division. In the promotion or distinction of every officer a record of his successful sanitary administration must be kept and required. This record shall be produced from the records of the Sanitary Department of the R.A.M.C., and be based on the incidence of water-borne disease amongst the men under his charge and on the Sanitary Officers' previous reports of inspections of camps and methods, special note being taken as to whether the remedy for any defects was within the power of that officer, or whether the responsibility was to be fixed upon a higher officer.

There can be no officer in the Army, be he officer of Guards or Volunteer corps, who will not welcome this new interest and responsibility in the welfare of his men. It must at once be made absolutely clear that there can be no departure from this principle, and that there is no place in the King's service for any officer who might think these duties and responsibilities of minor importance or outside the sphere of his deep interest.

In the official reports of the Sanitary Department on the sanitary work of superior and general officers, a record must also be kept of the efforts made by such officers to take into consideration the reports of the Sanitary Department on the sanitary administration of officers otherwise eligible for promotion or distinction. In the possible case of repeated

contravention of this principle, the Director-General of Sanitation will directly call the attention of the Advisory Board to the matter, who will bring the same before the Commander-in-Chief.

Sanitary Officers of the R.A.M.C.—Whilst all officers of the R.A.M.C. are to be, as at present, trained in military hygiene, that they may be able to advise combatant officers on the best means of applying their new knowledge and instructions to the greatest advantage, a special number of R.A.M.C. officers, who have either distinguished themselves in this branch in the Army or have been passed into the Army on this account, must be regarded as Sanitary Officers, in the proportion, perhaps, of one to a division. Their duties shall especially be:—

1. The education of all officers placed under their care in the methods regarded by the Sanitary Department of the R.A.M.C. as the best to be adopted at the time. This information they should give by printed instructions, lectures, or demonstrations, in such a manner as to enable officers to qualify in this subject either on admission to the Army or at the subsequent examinations required at present for promotion.
2. The education, certification, and re-examination of the men of the water section.
3. The education of the men on the disasters resulting from insanitary conditions of camps or water supply, and the encouragement of the men in a feeling of comradeship in prevention of water-borne disease—their worst foe in war or peace.

Practically speaking, the Sanitary Officer's duties terminate at the declaration of war; if his work of education has not been completed by then, his presence on the battle-field can have but little influence in warding off the coming disaster. If his work has been well done in the time of peace, success will follow his men. The responsibility is now with the officers of all units, they are the responsible executive for the sanitary teaching given. On active service Sanitary Officers would best be employed in the immediate separation of any suspicious cases of these three diseases, and in assisting general officers in the selection of camp sites. In addition to the Sanitary Officers of divisions, there must be a Sanitary Officer, ranking with the P.M.O. on the staff of every army corps, and on the head-quarter staff of every expedition or war. There must also be a Director-General of Sanitation, or Chief Sanitary Officer of the Army, who shall be on the Medical Advisory Board, on the Army Board, and on the War Office Council. Sanitary Officers shall only deal with questions of preventive medicine. Sanitary Officers are not officers of the water section, except when the men of the water section are being trained by them.

The Water Section.—The men of the water section should be specially recruited for intelligence and trustworthiness in the proportion of 2 per cent. of strength. They are to be specially employed men, borne on the

strength for one purpose only, to be recognised as men technically trained to provide their corps or unit with "approved" water, and to guard it against all the water-borne avenues of typhoid. The training of the men of the water section will devolve upon the Sanitary Officers of the R.A.M.C., or in exceptional cases on the medical officer of the unit or garrison. The Sanitary Officers shall also train a reserve of water section men, not exceeding another 2 per cent. of strength. After training and certification, the men of the water section shall pass absolutely under the control of the commanding officer of the corps of which they are to form part, who is directly responsible for the carrying out of their duties, subject to the advice, recommendation, or orders he may seek or receive from the staff officer (sanitary). These men shall be taught the responsibility of their work. Their success, as in the case of officers, must be noted and meet with its reward, both in war and in peace. The duties of this section stationed abroad in times of peace, I have indicated elsewhere, suffice it to say here that the principle of "approved" water only is to be carried out by them at all stations abroad, and is to follow the men into the bazaars, which are at present largely beyond barrack rules, and produce disastrous results. The men of the water section will learn that the technique required for the sterilisation of typhoid or cholera water to be used for drinking purposes is a laboratory experiment, and is not the same thing as preparing hot water for a bath. The serious responsibility of their duties, requiring special recruiting and training, the smartness and rapidity of action required, and the influence and respect they are to command amongst their comrades, require that everything should be done to give them prestige in the corps or unit of which they form part. The designation "water section," in preference to "sanitary section," has been adopted for several reasons. These men must have no other sanitary duties whatever, and therefore, they are not a "sanitary section."

Progress and Advance.—Every effort must be made, by offering distinction or reward to officers or men of either Navy or Army, or to civilians, who shall be able to suggest any suitable modification of the methods at any time in force, which shall render the work of this corps more simple, rapid, or effective.

It will have been noted that the scheme endeavours to interest directly every officer and man in the Army in preventing the action of their three main destroyers, and to bring the highest sanitary teaching to the service of every interested officer and man. It endeavours to avoid adding one ounce to transport unnecessarily, and at the same time to make it clear that the general who shall leave that ounce behind is courting disaster and inflicting on himself the absolute penalty of subsequent tons of useless transport. If he deny the soldier that ounce of extra transport, he will have to carry as an invalid the soldier himself. I have shown that the remedy for these evils is a campaign within a campaign, to be fought *pari passu* with every step of every unit of the Army, and that the unseen bacillary enemy is as real and as disaster-bearing as the human

foe. To take no account of this foe, to under-rate its power, or to trust to the chance of avoiding it, as is the rule in military strategy at present, is to be a quarter of a century behind the times, is futile, and must in the future bring disaster and disgrace on the general who shall exhibit such weakness.

The advantages of this scheme are:—

1. Total immunity from water-borne disease, which amounts to four-fifths of the mortality and invaliding of Armies.
2. Absence of discomfort and inefficiency on the march from minor illness.
3. Diminished thirst and discomfort by accessible tea, meat-extract, soup, etc., several times a day, in place of foul water, a biscuit, and late transport.
4. Enormous reduction of transport.
5. Great increase in effective strength.
6. Liberation of the R.A.M.C. officers and men for care of the wounded, by emptying the typhoid and dysentery hospitals.
7. Acceleration of the war and saving of enormous expense.
8. The placing of responsibility in the proper quarter for the future, making such subterfuges as "Hospital Commissions" or enquiries an impossibility.

The *essentials* in this scheme are:—

1. A trained water section of 2 per cent. of the strength.
2. The training and education of all officers in sanitary methods.
3. The education and training of the men in the advantages to themselves and their comrades.
4. The appointment of expert Sanitary Officers.
5. The responsibility of all non-medical officers for the executive sanitary work of camps or units.
6. Responsibility of the same officers for the incidence of water-borne disease—enteric, dysentery, and cholera—in their units.
7. The transport of this water section to be sacred, used for no other purpose whatever, largely independent of all other transport. The transport of reserved fuel, etc., to take precedence, if required, of everything except one day's ammunition.
8. The establishment of a tradition, that it is dishonourable and a crime to use any water for drinking purposes not "approved" or allowed.

I now leave the scheme in your hands, anxious that if you are in agreement as to the essential points and as to the considerable success that might fairly be expected, you will express that opinion, as well as any difference of opinion on any minor points. The particular technique at present suggested is likely to be much changed and improved upon in the

course of time. The essentials in organisation, to which I have referred, are likely to be found permanently necessary. I trust, however, that you will agree with me in insisting that the time has come for systematic endeavour to secure for the rank and file of every part of our forces in both Services, in war and in peace, an "approved" water, and the closure of all other avenues of water-borne disease. It must be remembered that in any great struggle in the future the Regular Army will only be the trained nucleus of that great force of Volunteers, home and colonial, who, desirous to meet the enemy, do not volunteer to suffer uselessly weeks of filthy, neglected, and too often fatal sickness, through being compelled to drink "unapproved" water, when the avoidance of these evils together with the means to prevent them can be shown to be a direct benefit to every department of the Army in the immediate function for which it has been created.

The CHAIRMAN (Sir William Broadbent): — I am sure we are all greatly indebted to Dr. Canney for his most interesting lecture. We are all agreed as to the destructive influence of typhoid fever in Armies, especially when on active service, although not confined to active service, and we are bound to admit the insufficiency of the existing means of prevention. This is not altogether from ignorance; but we have almost confessed our impotence to deal with this fatal disease. Dr. Canney in his address, proceeds on the assumption that the main channel of infection from typhoid, and other diseases which he has specified, is water. Other channels have been suggested, viz., dust and flies; but the degree to which they contribute to the spread of typhoid fever is still very much a subject of discussion. Whatever importance may be attached to them, they are subsidiary to the water-borne typhoid fever, and I hope the discussion will turn mainly on the prevention of water-borne typhoid, for it would be a pity to divert our attention from this, which is certainly the most important means of disseminating typhoid fever, by a discussion of methods which are of secondary importance. With regard to the efficiency of the method proposed, if it could be insured that no soldier drank anything but boiled water, I think we should get the upper hand of typhoid fever entirely. The whole question turns upon its practicability. This we can say anyhow, that the scheme has been well thought out. It is not brought before us in a nebulous condition. Dr. Canney has gone into details by which this boiling of water may be secured, and although, of course, it must be borne in mind that after a long march, or after the excitement and exertion of a fight, a soldier cannot be prevented from drinking the first water he comes across, yet, if he starts with his flask full of pure water, if the water-carts which follow contained nothing but pure water, and, if at these camps where men are assembled and most of the disease is contracted, nothing is drunk but pure water, an enormous gain will have been obtained. With regard to the practicability of the scheme, I am not in any wise in a position to speak. We must look to members of the R.A.M.C. and to those engaged in the administration of military work for their opinion. An extremely important part of the scheme is the education in peace-time of everybody, officers and men, in the importance of drinking this pure water only, and of endeavouring to enlist their sympathy to make it a point of honour among them to carry out these instructions, which are for the safety not only of themselves but of their comrades. I hope we shall have the benefit of the views of those who have had actual experience in the present war, such as Lord Dundonald, who, I am glad to see, is present, and who have had experience in India.

Major R. H. FIRTH, R.A.M.C. (Professor of Military Hygiene at Netley):—I have great pleasure in opening the discussion on this extremely interesting lecture; it is a subject in which I have been interested for many years, and which in my official capacity engages my attention almost every day. One could not help being struck, in listening

to the lecture, with the fact that the predominant tone was that "prevention is better than cure." That is a doctrine to which I think all in this room can subscribe. No intelligent man who has been on service could help being struck with the enormous leakage and wastage which takes place in a force in the field from disease, and which we know is largely preventable. There is no doubt that if we can check that leakage and wastage and the resulting overloading of our hospitals, we not only add to the numerical effectiveness of the force, but we add materially to its mobility, and we also add to its efficiency and rapidity of striking a blow, and thereby reduce the cost. Although Dr. Canney's paper bears the title "Typhoid, the Destroyer of Armies, and its Abolition," I think that any remarks we may make may be specially directed to two points which stand out pre-eminently in the lecture: first, that the greater part of the disease in Armies in the field is mainly preventable; and, secondly, that this preventable disease is largely water-borne. As you, Sir, have just said, the question as to whether enteric or typhoid fever is entirely water-borne is a moot point, and I do not think we need enter into that question to-day. But even supposing it is not all water-borne, or that only one-tenth is water-borne, if we can check that one-tenth, we shall have done good. Dr. Canney's proposal is essentially a scheme to obviate leakage and wastage from a preventable disease, which preventable disease, as I say, is largely water-borne; but when we come to look into his proposals we are at once confronted with the fact that the author's suggestions are very closely associated with the larger question of general sanitary organisation in our Army. Our history in the past in respect to sanitary organisation has not been altogether satisfactory. That fact is familiar, probably, to most persons in this room, and I need not dwell upon the reasons why; but there is no doubt there has been a certain want of sympathy in high places with the general policy of prevention of disease up to the present time in the Army. But although the past, as I say, has not been very promising or very satisfactory, I am disposed to think that our future is extremely hopeful. I believe that in the hands of a sympathetic War Minister a great deal can be done, and will be done, to evolve in and for the Army a sound sanitary service. The whole gist of Dr. Canney's paper is really, it seems to me, a question of how we are going to organise that sanitary service. There are two possible ways by which we can do it: one is to evolve through the present R.A.M.C. certain highly specialised companies and hand over to them the whole of the sanitary service of the Army. That may at first sight seem logical, and a very good arrangement, but a moment's reflection will show that it would be impracticable. The time is not ripe for that, and it would be a fatal error to hand over the sanitation of the Army at large to a corps which is not endowed with executive powers to carry out what they consider to be right. If these powers can be given to them, well and good; but my own opinion is, that the time is not ripe for such an evolution. Then we must ask, What is the alternative? The next best thing, in my opinion, is to organise somewhat on the lines of the scheme we have heard from Dr. Canney, and in the main I express great sympathy with the views he has put before us. It is very clear that the fundamental basis underlying the scheme is, that any sanitary organisation for the Army must be put on as broad a basis as possible—that is to say, we must place the onus of responsibility for sanitation upon the smallest unit possible. That, in my opinion, is extremely sound. Such being the case, Dr. Canney very rightly divides the whole organisation into three definite parts: you must first have the sanitary officers; secondly, you must have the *personnel* or men; and, thirdly, you must have a full and whole-hearted co-operation from all ranks to secure adequate sanitation throughout the Army. Now I do not propose to occupy too much of your time, but I should like to speak briefly on each of these points. Take the case of sanitary officers. It is my privilege in my position to have the instruction of all young officers for the R.A.M.C. in preventive medicine, and I say, without any hesitation, that we have in the R.A.M.C. many officers who have been for years eminently qualified for the duties of sanitary officers, and the fact that they have not had full scope to perform those duties has been no fault of their own or of their immediate chiefs, but has been the fault, or largely owing to the fault, of the want of sympathy for this class of work in high

places. I have reason to believe, however, that that era is passed and that we are near the dawn of a new epoch—at any rate I hope so. That being the case, there is no doubt there will not be the slightest difficulty in obtaining an adequate number of highly qualified and competent officers from the R.A.M.C. These officers after undergoing special training should be allocated to divisions, or even smaller bodies of men, and would be able to supervise the whole of the sanitation of the Army. Having thus provided certain qualified experts as guides, what is the next stage? The next stage is to find the tools by which those experts can carry out their work, and those tools, in the ordinary language, mean men. Dr. Canney suggests that we should organise and place with each unit what he calls a water section. For myself I think there is a great deal in that idea; I do not say I accept it absolutely at this present moment, because it is a matter which requires further consideration; but at the same time we must look at it sympathetically, as I believe there is something in it. To many this may seem a somewhat radical and revolutionary proposal; but if those cognisant with Army life think for a moment, they will be aware that there are already existing in each unit or corps a body of men who are, so to speak, ear-marked and set aside for specific work—I refer to the men told off for "first aid." I do not wish to be misunderstood on this point. I do not want to see the men for this water corps ear-marked as the men are who are trained for first aid to the wounded, because there must be an essential difference between the two groups. The men who are at present trained for first aid to the wounded are fighting men, men who bear weapons of war and take their places in the ranks on the parade ground. They are only, so to speak, lent for this specific purpose if they can be spared from their other duties. If I understand the author rightly, the men who are to form the integral part of the water section are to be special men, and very rightly so. They must be men specially enlisted, and highly intelligent men; they must be borne on the strength of the corps or unit for no other purpose than that of supplying "approved" water. The moment you depart from that idea and allow the men to be put on ordinary fatigues and general sanitary duty, the whole scheme must break down. That being so, it will not be difficult, starting as we do with our trained sanitary officers, to train these men in the technique of obtaining pure water. Although I go so far with Dr. Canney as regards the scheme, I am sorry to say I join issue with him somewhat in regard to his method of obtaining that "approved" water. I think he has been a little too narrow in his views. He has dwelt too much on the possibilities of obtaining good water by boiling only. I hope if this water section ever comes into actual existence, that the men of that section in the hands of my hypothetical sanitary officers, which I think will come into existence, will be taught not only the sterilisation and preparation of "approved" water by means of boiling—that is to say, heat sterilisation—but that they will be taught to do it by every possible means known to science—it may be by filtration, or it may be by chemical re-agents, because there are cases constantly occurring in military life when one method is suitable and the other may not be. We must take what is suitable to the occasion, that is to say, make use of every possible means at our disposal. Having got our teachers and our men, the whole crux of the problem, it seems to me, will turn upon the question of responsibility being carried home to the smallest commander, that is to say, to the company officer; and anyone who has had experience of service knows perfectly well that sanitation in actual practice really does come down to the company officer. The point I should like this meeting thoroughly to ventilate and grasp is, that for the success of any such scheme we must have the most whole-hearted co-operation of the ordinary officer—the non-medical officer—because unless that is done the whole scheme must break down. Dr. Canney, I notice, suggests that cognisance should be taken in confidential reports by general officers commanding of the sanitary efficiency of regimental officers, especially of the commanding officers. That will strike many as a rather dangerous proposal, but for my own part I think it is rather a good proposal, because unless officers commanding units—it does not matter whether a bearer company, a battery, or a regiment of infantry or of cavalry—have brought home to them that on them the responsibility rests,

you will never have efficiency, and they must be further made to understand that they will get *kudos* for their corps if they have a low percentage of sick: whereas if their percentage of sick from preventable disease, the class of disease we are discussing now, water-borne disease, is high, then by all means let those commanding officers of units get a black mark. I do not think I have anything more to say on the subject, except that on the whole the scheme as propounded by Dr. Canney has my cordial sympathy, and I think myself, with a little further thought and consideration, we may be able to make something of it.

Major-General the Earl of DUNDONALD, C.B., M.V.O.:—I must apologise as a layman for offering a few remarks on the admirable lecture of Dr. Leigh Canney. My experience in South Africa led me to the belief that it is impossible to make water safe for drinking purposes by filtration only. To my mind it can only be done by subjecting it to heat, a nd with that object in view on my return to this country I devised a water-cart, the vessels of which could be used for boiling purposes. With ordinary fuel, in cases where this cannot be obtained, petroleum, if carried, would be invaluable as recommended by the lecturer; at any rate the idea should receive a fair trial. When we went to war, our arrangements for water were no doubt in accordance with the regulations, but all thinking minds must feel that they were not in accordance with the general progress reached in the year 1900; but no doubt in future if we attend, or those in power attend, to the advice of men like Dr. Canney and the last speaker, we shall save our thousands in war-time. With regard to other causes which promote enteric, I think the question of rations might be considered, as to whether a long continuance of bully beef and biscuit does not render men's stomachs irritable and susceptible to the easy assimilation of the germs of disease. There is another matter which it strikes me is worthy of consideration in a meeting such as this, and that is the question of standing camps. It appears to me that no site of a standing camp covered by bell tents can remain for any length of time in a sanitary condition. I refer here more particularly to camps that must of necessity remain for long periods on the same place. To make camps such as these healthy for refugees or soldiers, the floors of the tents and a limited space round them might be asphalted, and thus could be periodically cleaned, while other portions of the camp could be kept from being contaminated by dirt if surrounded by wire fencing. In other words, the soil of every portion of a camp in the immediate vicinity of cooking or sleeping should either be rendered impermeable by asphalte or inaccessible by fencing to a distance of say 100 yards from the tents. I do not think it is possible to over-estimate the importance of instructing every officer in the Army in sanitary work, on the maintaining of camps in a cleanly state, and in everything which will assist the preservation of men's health in the field. You cannot expect the company officer and the colonel of the regiment to be the only persons to take an interest in this matter. If those in positions of responsibility will only take a proper and thorough interest in sanitary matters, and in introducing proper sanitary systems and appliances we shall have the junior officers of the Army and the men soon following suit, and adapting themselves to new conditions.

Dr. J. W. WASHBOURN:—You have kindly invited me, Sir, to take part in this discussion. I feel I have some qualifications for doing so, inasmuch as I served for many months in various parts of South Africa, and am consequently well acquainted with the conditions under which the soldiers live. We are all aware of the terrible loss of life and the serious loss to the effective strength of our forces in South Africa through enteric fever. We have to consider how this can be prevented in the future, and in order to do so we must have, first of all, a clear conception of the mode by which the disease is conveyed. Enteric fever is due to the swallowing of food or drink which has been polluted with human excreta. In the vast majority of cases, the disease is conveyed by the excreta of patients suffering from the disease, but in certain cases it may be conveyed by the excreta of persons who are apparently healthy. Contaminated water is certainly the principal means by which enteric fever is spread. This has been well shown by Dr. Canney in his paper as occurring in South Africa and in Egypt, but we need not go so far afield to recognise the truth of his statement. Not so many years

ago an outbreak of enteric fever occurred at Maidstone, where some 1,900 people in a short time were down with the disease. This outbreak was most definitely proved to have been due to the contamination of the drinking water. But we ought to consider whether there are not other modes by which the disease may be conveyed. At Maidstone, after the contaminated water had been shut off, cases of enteric fever continued to arise, and their distribution was of great interest. The first large outbreak of the disease could be easily traced to the water; it followed the distribution of the water of a certain section of the public water-works. The subsequent distribution of the disease was spread much more irregularly through the town, and was no doubt due to some other method of conveyance of the disease. This had been prophesied by Dr. Adams, the Medical Officer of Health. We all know that those who are in attendance on cases of enteric fever do contract the disease; and I think everybody who has been in South Africa must be convinced of the fact that the disease is also conveyed by flies and dust. The enormous number of flies that collect around the latrines, and in the cook-houses, at once suggest that they are partially responsible for the spread of enteric fever. Anyone who has been in a dust storm and has seen the quantity of dust that is carried into various articles of food, cannot fail to be impressed with its importance as a means of conveying the disease. What we have to do in order to prevent the spread of enteric fever in the field is this:—First, we have to provide a fair water supply; and, secondly, we have to see that excreta is properly disposed of. We must consider whether that is possible. It has been often urged that when an army is on the march it is quite impossible to procure proper water and to take proper sanitary precautions. Dr. Canney has shown that it is possible without any very great expense, and without any very great extra amount of transport, to provide pure water; and I think it is not very difficult to provide for the proper disposal of excreta. It is chiefly on the march that the difficulties arise. Everyone who has had experience, at any rate in South Africa, will agree with me that soldiers do not contract enteric fever while they are on trek, but that they do contract it when they come into standing camps; and it is in standing camps where proper sanitary precautions are perfectly easily made. The next question is, How can these precautions be carried out? Dr. Canney has made a very admirable suggestion, that there should be a water corps, who are to look after the proper supply of water for the troops. But I think one ought to go even further than that. I think we ought to have a proper sanitary corps to look after not only the providing of pure water for the troops, but also to see that all other sanitary precautions are taken, especially in the case of standing camps. I think that corps should be a branch of the R.A.M.C., who should have proper authority, proper rank, and proper responsibility. I have not the slightest shadow of doubt that enteric fever can be prevented with very little trouble and very little expense from occurring in armies in the field; and I think Dr. Canney has done a very great service in bringing the matter before us this afternoon in so able a manner.

Mr. S. RIDEAL (Fellow of the Institute of Chemistry):—Being neither a medical man nor in the Service, it is difficult for me to deal with the question of the methods of organisation suggested by the author, but they seem acceptable to those speakers who have already spoken, and it is obvious that some such organisation is absolutely essential to diminish the terrible mortality of armies in the field. I wish, however, to speak on the method by which the sterilization of the water is to be brought about. Dr. Canney's kettle seems to be a very crude method for attaining this result. We all know there are three methods of producing sterile water: boiling, filtering, and by chemical means. The latter two methods seem to me to have advantages over Dr. Canney's suggestion in the question of transport, which seems to be one of the very fundamental things that one has to consider. From the transport point of view, the thing which brings about the sterilisation of water without requiring any daily dose of fresh material either in the form of chemical or in the form of fuel, will commend itself to the authorities. This condition is fulfilled by a sterilising filter. We have had experience in the South African campaign of one form of filter, which apparently has not fulfilled the conditions of

actual warfare, but since that experience, which has been dearly bought, we have had experiments made by an official of the Army, Professor Horrocks of Netley, who has shown that another form of filter, the Pasteur-Chamberland, is capable of producing under long periods of service a water free from typhoid germs. The difficulty, however, in the past with regard to this filter has been that its yield is small; but if the yield of a single candle is small, it is only necessary to increase the number of candles to obtain any given quantity of water. That brings it back to a question of transport, and in a long campaign such a battery of filters must necessarily weigh less than the *matériel* for heat sterilisation which involves a daily dose of fuel. On the other hand, for emergency purposes, chemical means seem to warrant their use on several occasions. Dr. Parkes and myself,[1] reviewing the different methods available for chemical sterilisation last year, came to the conclusion that bi-sulphate of soda was capable of bringing about sterilisation of water as far as typhoid is concerned. The quantity necessary is 15 grains per pint, and a time of contact of 15 minutes before the water is fit to drink. Dr. Canney states that the actual weight of apparatus and fuel required on the march to Bloemfontein would have increased the transport by 2 per cent., that is, 12 tons upon the 500 tons. By the bi-sulphate of soda method the actual increase per cent. on the transport would be only 1–25th per cent. In passing, I may mention, in regard to bi-sulphate of soda, that this weight, 15 grains, is much higher than the weight required by other chemical sterilisation agents. Bromine, for example, which was used in the Soudan Expedition, is effective when only 2 grains per pint are used, or practically 1–7th of the weight of the other chemical, so that if this bromine method, which is used in the German Army, was found practicable in ours, the actual weight of transport would be even less than that required by the bi-sulphate of soda method. Dr. Canney finds that 200 lbs. per mule would give 4 pints of boiled water per man for 100 men for seven days, whereas the actual weight of bi-sulphate of soda for the same work is only 6 lbs. The criticism of the chemical method is the time required. Fifteen minutes is the minimum time in the case of bi-sulphate of soda before the typhoid organisms are killed; but I find that Dr. Canney suggests with his kettle waiting practically 17 minutes—11 minutes to raise the temperature of the water and 6 minutes for cooling it sufficiently to drink—so that the heat sterilisation method takes a longer time than the chemical method which I am advocating. It seems, therefore, that for long campaigns and for permanent camps, a sterilising filter of the Pasteur-Chamberland type is preferable, and that for rapid marches and short campaigns through countries with doubtful water supplies, the chemical method is also preferable to that of heat sterilisation, except in those cases in which a regular supply of fuel is likely to be found *in situ*. I thoroughly agree with Professor Firth in his view that the officers in charge of the camp sanitation should be trained and efficient in all the likely methods of water purification, as local conditions will determine which of the different methods can best be utilised.

Surgeon-Major W. G. BLACK (retired A.M.D.) :—I took some interest, when serving in South Africa some years ago, in the question of typhoid fever, which existed then, as it exists now. In South Africa a great deal depends on the locality and on the river near which you are encamped. Some rivers are foul and unhealthy, naturally from their position and course, while others are perfectly clean and healthy. The waters of those in the mountainous districts of the Drakenberg, Amatolas, and Winterberg are perfectly pure and healthy. There is as magnificent water to be obtained there as you can get in this country in Westmoreland or Cumberland. When you come to the flats you have a different kind of water altogether. The rivers there run through flats of clay soil and marshes, and the water is naturally muddy and contaminated all through them. In the course of campaigns in South Africa the greatest danger is to be apprehended from standing camps. The water from the rivers or springs becomes polluted by the

[1] "A suggested method of preventing water-borne enteric fever amongst armies in the field."—*Transactions of the Epidemiological Society of London, N.S.* Vol. XX. 1900–1901.

denizens of the camps, their followers, and their cattle, and their horses, which graze all over the neighbouring fields and hills. It is necessary then for the camps to be moved occasionally. The generals themselves and their staffs may take the precaution to remove the camps to more healthy localities, when the old ones get fouled, because there are abundant areas in South Africa to choose from. Some years ago typhoid was prevalent in towns as well, during the existence in them of wells and of rivers that passed through the places. Those rivers were contaminated by the consequences of agriculture, that is, the fields were cultivated in the neighbourhood, and irrigation established from the river by sluits, and the cattle and sheep were fed over the mealie and grass fields, with the result that the water which came through the sluits in the streets of the town was contaminated by the excreta of the animals. Therefore, typhoid fever prevailed in the garrisons, as well as among the inhabitants through the same water. That was remedied in after years by establishing water-works, as in Pietermaritzburg in Natal. There they obtain the water from the hills, and conduct it into the town and issue it to the different houses by pipes, and typhoid fever has nearly disappeared. In Cape Town also some years ago, typhoid arose from somewhat different causes. Cape Town is a dry place, with no river, and the contamination came from what were called "stercus carts" which conveyed the excreta of the inhabitants every morning from 6 to 9 o'clock through the streets for the purpose of taking it to the farms, as is done in many districts of this country, where it was sold. The air in the morning, especially when there was no wind, was of the most offensive description, and permeated through the open windows, the consequence being that one quarter of the barracks in Cape Town was called the "Dead House," and any officer not on duty, who had no other place to go to, was put in the "Dead House," and invariably took sick of typhoid fever, and was eventually invalided home. In Cape Town now they have established regular water-works on the summit of Table Mountain, which gives perfectly clear water, and is not subject to defilement by animals grazing, with the result that Cape Town is nearly free from typhoid fever. The essential necessity in a war at the Cape, is to have camps which are movable, so that typhoid may be escaped by moving the camp when required. I see Dr. Canney has not introduced the question of the prevention of typhoid fever by inoculation when it prevails in the district. That, of course, is an abstruse medical question which is not even yet settled; and the reports in the course of this war may induce a settlement of the question, as to whether it can be prevented by the methods which have been recommended.

Dr. A. CONAN DOYLE:—Anyone who, like myself, with a minimum of medical knowledge on this point, but with a good deal of zeal, went through the epidemic at Bloemfontein, must have had an indelible impression left on his mind by that most pitiable event. When on that occasion I used to go from the hospitals, and, as I had the privilege of doing, accompany the Army for a short period, I could not help being horrified by seeing the absolute neglect of every possible precaution on the part of the men. You would see a man coming in, at one end, with that terrible illness which has invalided so many men back to England, and at the other end you would see the cause, the gross carelessness which could be easily obviated, men kneeling down drinking from wayside pools water obviously polluted, without any remonstrance on the part of anyone. Apparently it was nobody's business. To anyone who had just seen the shocking results of such conduct it was a most pitiable sight, especially when one felt oneself absolutely powerless to prevent it. It is for this reason that I have listened with the greatest admiration to Dr. Canney's paper, as it seems to me a practical, bold method of combating this evil, and I hope that the paper itself and the discussion which has followed it will bring it to the notice of the authorities. It seems to me that if it was not stretching the red tape too far, one might say, "Why should not Dr. Canney be sent straight out to Africa, with as many of his apparatus as he wished to take, and be attached to one single column, so that we may see whether the results of his scheme in that column will be better than the results obtained in any other column"? When one remembers that in the papers this very morning there were 40

deaths, nearly all of them from enteric fever, and that those 40 deaths means that many hundreds, and possibly thousands, of men are lying in their beds in South Africa at the present time suffering from this fell disease, which Dr. Canney says with truth can be stopped, why should we not send him out to try his own experiments with his own apparatus? And if my friend behind me, Dr. Rideal, thinks that the chemical solution is the better one, let us send him out to another column, and let us compare the results of the one column with that of the other column. It seems to me that this is not a time for academic discussion. The house is on fire, and it is time we took some practical means of putting it out again. Although I am in entire sympathy with Dr. Canney, my only criticism is, that by the time we get our private soldier into such a state of discipline and such a state of self-denial that he will look at water when he is thirsty and not drink it, by that time the whole of the human race will be educated beyond all war. The English soldier, as brave a man as ever lived, often takes a preverse delight in doing the thing he should not do, the moment the eye of his superior is withdrawn from him. I remember a case just at the beginning of the Dongolese War, when the troops were going up, an English regiment was passing an obviously polluted pond close to the Nile. Being very thirsty, they broke their ranks and made for the pond. An officer rushed between them and the water, and cried out to them: "For God's sake, do not drink: it is poison." One man shouted out: "If it was labelled red lead and cholera, I would drink it," and they did. I believe in that regiment there were 110 cases of cholera in a short time. I am afraid that this is the real difficulty, the human element, in Dr. Canney's scheme. And I cannot imagine our young sporting regimental officers in the character of the Sanitary Inspector. Allowing that our officers and soldiers can only rise to such heights, I think that Dr. Canney's scheme is a most admirable one.

Brigade Surgeon-Lieut.-Colonel A. B. MYERS: — Having had some experience, especially in connection with the Suakim Campaign, I think I am at liberty to make some remarks on this occasion. We all agree with what Dr. Canney has said in his paper, that any steps which can be taken to diminish the curse of our Army in time of war are most important. I should like to ask the lecturer one point by way of criticism. I think he says that these water-bearers should be in front of the army, and just behind the scouts. If they are 2 per cent., and there are 10,000 men approaching the enemy, you would have 200 men with their water supply, and I should like to hear what would become of this body of water-carriers in front of the army if the enemy suddenly came upon them. Undoubtedly in time of war, if you could get your men with the water supply ready for the army when they arrived at any given place, it would be an enormous boon, but is that practicable in time of war? I think not. As to the question of men arriving at a place parched with thirst, we all know that they will drink any filth. In the campaign of 1882 I believe men drank water in which their fellow comrades were rotting. Therefore, if this boiled water is ready for them, well and good; but if they have to wait a quarter-of-an-hour or 20 minutes, you will not stop them drinking any water they can find. Even if the enteric produced by foul water is prevented, there are still other sources of this fever. With regard to the education of our men, this is a point that has not been touched upon. Going out to the war, I took upon myself to lecture our officers and men on the great importance of training themselves not to drink. We know that at home men are supplied with water-botties full of water. What do they do? They have not started more than 20 minutes or half-an-hour before many of those water-bottles are empty. At least that has been my experience. We can go many hours without water, and you know very well that when you touch water your thirst is soon increased tenfold. My teaching was that these men should learn to go without water. I trained myself to do so all day in the hottest parts of Central Africa. If you could train your men to avoid water it would be the saving of many lives, because it is this dreadful craving that makes men, when they arrive at a place, drink anything they can find. I believe that education, and explaining to the men the importance of training themselves to avoid drinking on the march as long as possible, would be of the greatest benefit to them. There is an interesting fact I should like to

mention with regard to flies—one little practical fact. When we were marching across the desert in that Suakim Campaign, starting at early morning, I used to amuse myself by counting the flies on the soldiers' backs, and the average was 60 to 100 flies per back, so that when we arrived on fresh ground, where there had been no flies, we brought tens of thousands of flies with us to set up a new centre of pollution.

Major H. A. CUMMINS, C.M.G., R.A.M.C. :—I feel sure there is not very much left for me to say after all the other speakers, but there is one thing I should like to mention which struck me in Dr. Canney's paper, namely, that he seemed to infer that a method of boiling water had not been used by the R.A.M.C. in previous campaigns In the Ashanti Expedition of 1895-96, where it was practicable, and there were posts up the country as far as the Prah River ; at all these stations the water was boiled, cooled, and served out to the troops, and no doubt this precaution kept down fever to a very large extent, especially enteric. There is great difficulty in rapidly cooling water after it has been boiled. With regard to the present campaign, especially at Paardeberg and Bloemfontein, I think the author is rather hard on the Sanitary Department. When we came to Paardeberg, supposing we had had our cans for boiling water, our paraffine oil would have failed, as our large convoy was unfortunately captured and there was hardly enough food for our soldiers. How would you deal with the soldiers in advanced trenches and with the men who were on picket on the hills ? This question of boiling water is a most difficult one. Fuel was very difficult to procure. Paardeberg itself possesses only a low scrub with very few palings or anything that can be used for fires. As we marched to Bloemfontein it was amusing to see the soldiers seeking every scrap of wood they could get hold of. The Boers had miles of barbed wire attached to wooden palings, and all those stakes in the line of march were pulled up by our soldiers and brought to camp with them in their endeavour to get sufficient wood for cooking purposes, and even on their march up to Pretoria and Johannesburg the noise they made by pulling up the floors of the houses to get wood to cook their food sounded almost like guns going off. Under those circumstances it was extremely difficult to obtain any material for boiling the water. When we arrived at Pretoria the water was very good—still many people boiled it. In our hospitals, as far as possible at Bloemfontein we boiled the water for the men. One of the causes of the spread of enteric fever may possibly arise in the hospitals themselves, It is very important to prevent them becoming centres from which infection can be conveyed by the flies to the camps. Every precaution was taken to destroy the excreta. The flies, however, were dreadful, especially at Bloemfontein. I think there is no doubt that the epidemic arose at Paardeberg, and this is shown by the Boers who were taken prisoners at Cronje's laager. I saw by the papers that they suffered severely from enteric fever soon after they reached Cape Town. The epidemic in Bloemfontein was terrible ; I suppose the worst ever experienced, certainly in South Africa. We find it hard to deal with epidemics at home. How difficult it was in South Africa, especially at Bloemfontein, can be seen from the fact that the enemy cut off our supply of water by wrecking the water-works, so that in the earlier period of our occupation water was scarce. We were under very great difficulties, and, I think, scarcely sufficient consideration is given to us under those circumstances.

The CHAIRMAN (Sir William Broadbent):—It is with very great regret that I have to retire before the discussion is terminated, but I had no idea that it would go on quite so long. There have been some extremely valuable suggestions made in the course of the discussion. The special value I should place on what we have heard from Dr. Canney is the educational influence that should be brought to bear long before the men are engaged in war. They should go to war prepared by their previous education to take the precautions which they are already accustomed to take against disease in this country, to carry them out, perhaps not perfectly, seeing that soldiers are after all but soldiers, but still, carry them out in a very much more efficient manner than they do now. To our disgrace we have enteric fever constantly in our great military centres, and we ought to begin by exterminating it there, and then we should have a chance of carrying out the methods adopted in times of war.

Sir William Broadbent then vacated the Chair, which was taken for the remainder of the meeting by Colonel Lonsdale Hale.

Brigade Surgeon-Lieut.-Colonel HILL CLIMO :—There are two points which have not been under discussion on which I should like to make a remark or two. We have discussed very largely the sanitary conditions of South Africa since the war began, but we have said nothing about what the state of South Africa was before the commencement of the war. We look upon India as almost a charnel house for enteric fever, and yet in the first 41 weeks of 1899, which corresponds with the period of peace in that year, the incidence of enteric fever amongst the British Army in South Africa was 80 per cent. greater than it was in India ! I think that proves the necessity of organising a sanitary corps during peace-time. The second point is the importance of having a means of distilling pure water or boiling it. There is no better proof of that necessity than the state of the American Army in China during the recent campaign. In the first two months of the campaign there were 500 cases of enteric fever among the German troops, who used the chemical method, and they were nearly all fatal. From the time the American troops went there up to last August, when the evacuation began, their hospitals were singularly free of that disease.[1] I think that is a most important point, and if we get a pure water supply, acting on the lines the lecturer has given us, then I hope to see a measure of safety introduced. It is a subject I have given a great consideration to for many years, and I am perfectly sure that when we have a better water supply, and when our young soldiers are taught, as they ought to be taught, by the medical service, how to maintain their health, they also will understand the necessity.

Mr. W. D. SCOTT-MONCRIEFF :—I venture to make a few remarks from the point of view of an engineer, not speaking with any authority on the important subject of typhoid fever. Although I do not suppose that the proposals which have been made by the author are final, either as regards the apparatus itself or the means of utilising the apparatus, I do not think that is altogether to the point, because if he has proved his case by showing that the sterilisation of water by heat is a practicable method, it follows that we should not wait indefinitely for a better, but give him an opportunity at once, if possible, of proving the efficiency of his system without the loss of a single day. It ought to be done at once. Dr. Conan Doyle really anticipated what I had to say in that direction. Speaking from the practical point of view, not with regard to bodies of men upon the march, but with regard to stationary camps, I cannot imagine that a more efficient steriliser could be designed than the old locomotive. It is a very efficient form of apparatus for heating water and raising steam, and after it is too old for the purpose of bearing any pressure it would need to be very old indeed before it was incapable of boiling water, and would be an economical and thoroughly efficient means of sterilising large quantities of water wherever it was available. I do not think that the argument is worth very much as to the incapacity of the soldier to resist the temptations of polluted water. If the importance of the sterilisation of the soldier's drinking water is properly realised, surely his training will begin in this country. It is a matter of little importance whether the water for the purpose of his training is pure, or not so long as the point is gained of his being thoroughly trained. At every march out from Aldershot, when there is a halt, there ought to be an opportunity for the water corps to go through the whole performance of sterilising the water and teaching the men to wait until it is ready for them to drink.

Captain G. WALKER, R.E. :—It is with some diffidence that I rise to speak in this discussion, as perhaps I have not looked at the subject from as scientific a point of view as others who have spoken. I hope, however, that some ideas born of regimental experience in India and other places may not be considered out of place. The first thing I have to say with regard to the lecturer's proposals is, that although they are admirable no doubt in the main, and their object is even more admirable still, yet

[1] Their water supply being produced by "water-distilling plants."—H. C.

perhaps he has rather failed to appreciate the difficulties which may beset their practical application on service. I think it is rather a question of transport. One mule will be required for every 100 men, and with eight companies that will make, say, 10 mules per battalion, which will mean a good many animals to be added to the transport with our armies in the field, which is already enormous. I think what we want is some sort of chemical sterilisation, which I believe is possible; some method which can be worked by the regiments themselves, the officers and the men being trained to do the sterilisation for themselves. This brings us to what I believe is the crux of the whole question. The officers of the regiment are the only people who can be held responsible for the efficiency of the men under their command, and they consequently are the only people you can come down on if the men are not fit. For example, if the men cannot shoot, the officers are held responsible, and the physical fitness of the men should be on the same basis. A most important thing in connection with the prevention of water-borne disease amongst troops in the field is the prevention of casual drinking on the line of march. You may give a man a bottle of pure water when he starts in the morning, but before long the bottle will be empty, and long before the march is over he will have a thirst that will make him capable of drinking anything. Unless you can put a stop to this casual drinking, I fear that any water-purifying scheme will be shorn of a great deal of its effect. I speak as a regimental officer, as my experience has been largely in regimental work; and I think the regimental officers have a great deal in their own hands. They are the proper people to take this particular point in hand. It will probably be said that it is visionary to expect men, with the education which our soldiers have received, to have such self-control; but if in times of peace men are educated with this object in view, I think a great deal of good could be done; I may say that I know from experience that it can be done. It is a matter of education—habit, if you will—but it is only by the cultivation of a habit that you can make it strong enough to withstand the promptings of nature. One more point occurs to me, which is, that most of us do not appreciate sufficiently the necessity of camp sanitation. On marching into camp or bivouac sufficient trouble is not taken with the arrangement of latrines and the prevention of the troops going all over the place for the purposes of nature. This is another matter which the regimental officers alone can effectually deal with, and you must, I think, convince them, and through them the men, of its necessity, before water purification will have any large measure of success. Briefly, the three main points in any scheme for the abolition of typhoid fever among troops in the field should be: First, the provision of pure water for the troops and the placing the responsibility for this upon regimental authorities; secondly, the education of the soldier in habits of self-restraint as regards casual drinking on the line of march; thirdly, the persuasion of all ranks of the necessity of proper camp sanitation. I think if we can devise a scheme embodying these principles, we shall be, under Providence, on a fair way to success.

Surgeon-General A. C. C. DE RENZY (late Indian Medical Service): — At this late hour there is only one point in the discussion on which I wish to say a few words, and that is the question of the danger of the propagation of typhoid and other water-borne diseases through the agency of flies and dust. My experience has led me to the conclusion that this danger is of little or no consequence, and should not be allowed to divert attention from water, which is the dominant factor in the spread of these maladies. My reason for saying so is that I know of several stations in India which were formerly great sufferers from typhoid and cholera, but which have, for many years, enjoyed almost complete immunity from them, this change coinciding sharply with the introduction of a pure water supply, while the dust and flies, which were always a great nuisance, have continued as they were. Two stations come prominently to my mind in this connection, viz., Fort William in Calcutta, and Colaba, a suburb of Bombay. In the 10 years preceding the Mutiny, the average death-rate of the British troops quartered in Fort William was 102 per 1,000. In 1870 the Fort was provided with a pure water supply, and since that date the death-rate has been about 10 to 12 per 1,000. In the four years ending in 1899 it was only 9 per 1,000.

Cholera, typhoid, and dysentery used to be the prevailing diseases among the troops, and to this day they are very fatal among the adjacent native population, who use the polluted tank water. The case of Colaba is very similar. This station was formerly so excessively unhealthy that the Government were strongly urged to abandon it as a garrison for European troops. Fortunately, this was not done. About 45 years ago the Vetrar water was laid on to the barracks, and ever since the troops have had fairly good health. In the four years ending in 1899 the average death-rate was about 10 per 1,000. These two cases are instructive, because the facts extend over a long series of years, and leave no room for doubt that, where a pure water is in use, flies and dust are impotent to disseminate such diseases as typhoid, cholera, and dysentery to any great extent.

Captain C. E. DANCE, R.E. (Chief Surveyor Metropolitan Fever Hospitals) :—I am not going to detain you at this late hour for more than a couple of minutes ; but as my work takes me into the whole of the fever hospitals in the Metropolitan area, I may perhaps be permitted to say a few words. There is one important point in connection with the prevention of typhoid and other infectious diseases which has not been touched upon in this afternoon's discussion. I think that, as a Royal Engineer officer, Sir, you will agree with me that the "pioneers" of the ordinary (Line) battalion should be specially trained in regard to the first principles of sanitation, but as far as my experience goes that is not so. In the corps in which I have the honour to serve now as acting adjutant the men are all mechanics, and we send a good many of them into the Royal Engineers, the Regulars, and I make it my duty from time to time to see these men and ascertain whether they have learned anything further since they have been transferred from the Volunteer service of the Royal Engineers into the Regular branch of the Army, and I am amazed to find that positively the instruction they received touches little if any more upon the mere rudiments of sanitation. We have had a good many eminent speakers here on sanitation this afternoon, more particularly on sanitation in the field, but the one point which I think I may be allowed to impress upon the assembly now is that boiling all water, and boiling only, has been determined by the greatest sanitary authority in the Metropolitan area—I am speaking now of the Metropolitan Asylums Board—to be the best deterrent against enteric fever. Recently I had to make preparations for the receipt of plague patients, and at the time there was a very long discussion by the principal medical and other officers of the Metropolitan Asylums Board as to how they should treat the excreta, and as the result we had to make arrangements for "boiling" the whole of the excreta from the hospitals which were to receive plague patients.[1] I hope my few remarks will be accepted, coming as they do from a junior officer of the Royal Engineer branch of the Service.

Dr. LEIGH CANNEY, in reply, said :—The practical unanimity and approval that have been expressed by this large meeting of experts from all departments of the Army, and especially by those of the R.A.M.C., and by the highly qualified civilian opinions you have heard, leaves little for me to add, except to reply to certain points that have arisen in the debate. It is obvious to all present that in this representative meeting there is a strong feeling of entire practicability, both as to the scheme of prevention itself and as to the measures put forward as necessary, and that those measures do not conflict with the work or interests of any other department of the Army, but are directly beneficial to the work and aim of each department. Practically complete approval has been expressed in the "essentials" of the scheme I have put before you. The object we have before us is simply, that by organisation and method the Army—Regular, Volunteer, and Colonial—shall, as regards methods of preventing typhoid, dysentery, and cholera, its three great destroyers, be absolutely level with the best that can be obtained in civil life. We are all agreed that no trouble as regards the actual

[1] The "boiling" of excreta would be in addition to the chemical treatment which is in force for dealing with the sewage from the Metropolitan Asylums Board Fever Hospitals ; hence this fact further shows the great value that specialists place upon the "boiling" method.—C. E. D.

education of non-medical officers, of men of the water section, of the pioneer section, and the men in the ranks, is too great in order to attain this far higher result as regards efficiency. Several speakers have drawn attention to the long delay in the adoption of the inevitable reforms I have indicated; no doubt the responsibility for such delay is a very serious one, and attention will probably be drawn to it in another place. Major Firth, who holds the high position of Professor of Military Hygiene at Netley, and has, both by his practical experience and by his high scientific attainments, authority to speak on the essential practicability and usefulness of this scheme, whilst reserving his opinion as to the final form it may take in organisation, has expressed strong approval of the same. He has drawn your attention to the enormous wastage in war from these causes. He agrees that the main channel of these evils is water. Just as we have prevented these evils entirely in the vast civil camps of susceptible Europeans in Egypt by the methods proposed, so there is strong reason to suppose a like result could be attained in the Army, both in the field and at stations. He has pointed out very clearly the radical importance of thoroughness in the execution of the details of the essential points raised. He has laid great stress on the education of, and the responsibility for these diseases being placed upon, the non-medical officer. As I have pointed out, the executive power and influence of these officers, after thorough training in practical sanitation both as regards the work of the pioneer section and the water section is very great, especially when success in this direction is to be recorded and to meet with recognition from the authorities. The officers of the R.A.M.C. can never acquire this direct power and influence themselves to the same extent, and they should limit their work to recording and to reporting the efforts of and the success attained by each of these officers after they have instructed them. The R.A.M.C. must never be tempted to take upon themselves the responsibility for such occurrences as Paardeberg, Bloemfontein, and Ladysmith. By including thoroughly in the future all officers from the general downwards in that responsibility, an enormous access of power, interest, and attention will be forthcoming to ensure the careful execution of orders, thus saving the whole force from the disasters which must otherwise overtake it. The R.A.M.C. must consider very seriously whether they will not gain great strength towards preventing these evils by such means, and if they are of opinion that this interest and responsibility to be shown by non-medical officers will, as I believe, greatly influence the result, they must insist upon securing it. Major Firth further pointed out what doubtless all those with special knowledge will feel, the importance of recognising that the water section will do no other sanitary work but preparing and securing an "approved" water. The remaining sanitary duties of camps, etc., will be carried out by the pioneer section. These two sections are totally distinct and must be kept so. Captain Dance, R.E., to whom I shall refer again, has very ably urged the importance of the men of the pioneer section being scientifically trained by the sanitary officers to divisions, and in the carrying out of these duties the non-medical officers who have been instructed in the same methods will be the executive power. Everyone will agree that the work of supplying an "approved" water, and guarding the other avenues of water-borne disease, is of such importance that it will fully occupy the whole time of the water section. Major Firth has said that there are other possible methods of providing an "approved" water which must not be lost sight of. I wish it to be clearly understood that the object of this paper is to show the need of a system of organisation sufficient to meet and defeat disease in war. At present, the system I have proposed as best suited to the requirements of an Army in the field is the method of boiling and serving rapidly tea or soup. That method may of course be changed to-morrow for a better—we hope it will be. It is, I think, important to have at one time only one system on which one absolutely relies, lest the multiplication of methods in force might lead to a tendency to delay in the prompt and ready delivery of materials, such as fuel required, etc. Major-General the Earl of Dundonald, so well known to you all for his past services to the Army as a great practical soldier, has agreed heartily to all the

principles I have laid down. So keenly has he felt, from the point of view of efficiency, the need of such a system of approved water, that he has spent much time and thought in developing an improved method of protecting and serving water. He agrees upon the importance of the education and responsibility of the non-medical officer being at once insisted upon from the highest officers downwards. He has pointed out the advantages of boiling as the present best method, and in this again he was supported by Captain Dance, R.E., the distinguished adviser to the Metropolitan Asylums Board, who has told us that a like conclusion is the result of the combined counsels of the medical and other officers of this Board. Dr. Washbourn, an authority on questions of pathology and bacteriology and with large medical experience in South Africa, has expressed again the view which he gave at Cheltenham, after hearing a paper read by myself on air-borne typhoid in Armies at the meeting of the British Medical Association, that if you protect an Army or camp against all the avenues of water-borne typhoid, as was done at the great barrage works at Assouan, you will have no epidemic of typhoid, but only a few scattered cases. Surgeon-General De Renzy has pointed out how in cases where such steps have been thoroughly taken, though the flies and dust storms remain, the camp or station is free from typhoid. Dr. Washbourn hoped that if the transport difficulties could be overcome the scheme would be adopted, as undoubtedly promising success. I think I have made it absolutely clear that, though there is initially a minute extra fraction only added to transport, transport on the whole is greatly reduced, and the scheme is one that should be properly put forward by the Transport Department for this very reason. Mr. Rideal drew attention to the interesting work he carried out in conjunction with Dr. Parkes on the use of a chemical. Whether this chemical is equally effective against dysentery and cholera, I think has not been shown clearly, whereas the method of boiling we know excludes all three. It is certainly a method requiring less transport, but unless it can be shown to be as certain as boiling in all cases, the minute fraction (only $\frac{1}{400}$ of total transport) required to be added daily for fuel in the boiling process is so small, as to be immaterial if there are compensatory advantages. It is probable that the ready service of warm drinks, as tea and soup, night and morning would be more acceptable than cold water containing a chemical. It is probable also that the filling of the water-bottles overnight with cold tea for the day, and the water-carts with cold boiled water would meet all requirements. Mr. Rideal referred to the "kettle" as "crude." I think, however, that an instrument that can produce sterilised water in one-fifth of the time taken by the best previously known instrument, with a smaller consumption of fuel and half the weight, and satisfying the extra condition that it shall be simple and readily repairable on the field if shot through, and capable also of serving tea or soup, can hardly be called "crude." It satisfies the requirements of all officers who have considered it as regards speed, etc., and they have described it as "perfectly feasible," and it has met with the approval of naval experts. It must be remembered that no other instrument has yet fulfilled all these conditions. Let us, however, hope that future developments will rapidly prove it to be "crude." At present it happens to be far ahead of anything that could possibly be regarded as fulfilling the above requirements. Dr. Conan Doyle has referred to the perverse mind of the British soldier, who delights in drinking anything bad or nasty. What appears as perversity is too often unfortunately the action of the man, who has no alternative. Knowing the unsatisfactory water arrangements in the past, as a rule, how can we regard his action as perverse, when he has never had an alternative? He knows perfectly well there is no systematic attention and care paid to water in war, and he frames his mind and action on the same basis. What can we think of officers who waste their time at a polluted river or pool urging thirsty men not to drink, whilst providing nothing else? Is the perversity in the man or in the officer? If you educate the British soldier on the advantages to be gained by himself and his comrades in accepting soup drinkable in 11 minutes from the moment of arrival, and served as readily and continuously to him as ammunition is served, he will come into line with the method. Who of us, with all our knowledge, would act differently from the man in the ranks

at Omdurman or at Paardeberg under existing arrangements, and who under the new system would prefer the polluted pool to cold tea or warm soup? Dr. Conan Doyle thought it would be difficult to see the sporting officer interested in sanitary questions. That may be the case; but even this class of officer may, when he finds promotion or distinction hanging in the balance, develop as keen an interest as any of us in the safety of his men. At least it must be made clear, if he thinks differently, his proper vocation is not the Army. Surgeon-Lieut.-Colonel Myers wished to know the disposition of the mules and men of the water section in the field. That, of course, would depend upon the value placed upon them by the commanding officer. They would not unnecessarily be placed under fire. One could not imagine them being placed between the firing line and the enemy. One could easily imagine them at the close of a thirsty march half-a-mile ahead serving warm tea precisely as the men came to the halt, the scouts being far ahead and the enemy further still. Surgeon-Lieut.-Colonel Myers made, as did other speakers of experience, some excellent remarks on training men only to drink at the end of the day. This has been largely practised in South Africa with comfort. Major Cummins, R.A.M.C., thought I had overlooked the fact that boiling had been successfully practised in Ashanti and elsewhere. In a pamphlet published three months ago on pages 6, 10, and 13 he will find the success of the system fully pointed out in the small campaigns of Ashanti, Suakim, and Abyssinia—the only three successes, sanitarily, of the past century. We all know the Army frequently boils water, especially at foreign stations in peace, but we know also that the technique of boiling infected water has not been taught to the men, and this most necessary education is provided for in this scheme. Major Cummins thought I had been a little hard on the Medical Corps regarding Paardeberg, etc. I have endeavoured to make it perfectly clear to the Army and to the public that such occurrences do not concern the Medical Corps. The responsibility was entirely upon the Commander-in-Chief at the time that this war broke out, he knew the dangers ahead for the Army, and the arrangements made to provide an "approved" water were absolutely inadequate. If I thought the R.A.M.C. could regard themselves or be regarded in any way as responsible for these continued disasters, no blame would be too great. If any members of the R.A.M.C. think that in the future they can take upon themselves executive power and responsibility for the carrying out of instructions and advice—a responsibility which Captain Walker, R.E., has also pointed out, must be regarded as the duty and responsibility of non-medical officers—then he is, I fear, only exposing the country to the danger of the like or greater disasters. Major Cummins referred to the difficulty of small pickets on distant hills, etc. In these cases the men would probably drink their soup before going forward and take water-bottles of hot tea with them, or, if desirable, smaller very light apparatus could be taken forward by hand, with the few ounces of fuel ration required. Mr. Scott-Moncrieff, C.E., in his able remarks, has pointed out that I have not regarded the apparatus as at all final. My particular duty has been to point out that what was regarded a year ago as quite impossible, is now, since I have drawn attention to it, regarded almost everywhere, by thinking soldiers and others, as quite practicable. I regard the practically unanimous opinion expressed and unexpressed of this large meeting of able experts on all the various points bearing on this question, in favour of practicability, as the sure seal that this scheme will essentially be carried out. Mr. Scott-Moncrieff has urged ably the immediate taking of steps towards a serious careful trial. He has ably pointed out how the scheme should be at once put in force at all manœuvres or marches, whether Regular or Volunteer, both at home and abroad. He has also placed stress upon the necessity for the education of officers and men commencing at once at home. Captain Walker was anxious to know if there was any chemical that could be relied upon for immediate action. There is none at present. A great deal of work is being done upon the subject in this country, in Germany, and elsewhere. Some process will probably be evolved in time. Captain Walker thought the ten additional mules per 1,000 men a large addition of transport. I have shown the penalty in transport and in diminished efficiency if they are left behind. I have shown that that penalty will happen with mathematical precision. I have shown

that the leaving behind a single one of the numerous typhoid hospitals, otherwise necessary, will more than provide the necessary water section transport for 45,000 men. I regret to have taken up so much of your valuable time in going thoroughly into the main principles involved in what is a new departure. I am sure that by your valuable opinions and remarks, the time has not been wasted. The question is a very serious one, and I have no doubt from certain official communications I have received, the whole scheme will directly be brought before the new Medical Advisory Board, who will spare no trouble in bringing their valuable experience to this question. They will not hesitate in their plain duty to the country, to urge the adoption of every point regarded in this scheme as essential, if they are convinced that it will add in any degree to the safety of the Army and the country. In some form, this scheme will have to be adopted. It is to be hoped that no effort will be spared to secure success in each essential point, however revolutionary these advances may seem to minds unaccustomed to the method and order necessary for the successful prevention of such evils.

The CHAIRMAN (Colonel Lonsdale Hale) :—I shall not detain you more than a moment or two in moving a vote of thanks to the lecturer. I am very sorry that the discussion has not been quite of the character that I hoped it would be. As Chairman of the Journal Committee, and with the aid of the Editorial Staff, I tried to get together an audience composed of holders of various views. To my mind, there has been a great deal too much approval of Dr. Canney's method to call this a satisfactory discussion. I happen to live near a military centre, in which are younger men than myself, and going there the other day I mentioned this lecture. These officers had all come back from South Africa, and when I mentioned that the lecture had relation to boiling the water for an infantry battalion, one of them said: "What, boil water for an infantry battalion with their tongues hanging out? Damned rot!" I wanted some representatives of the "damned rot" persuasion here this afternoon, but they have not come. We know there are very great difficulties in controlling the action of men in the field, but I wanted men to come here and declare what was their actual objection to the scheme. But the effect of Dr. Canney's lecture will be felt far outside this theatre. We have got so accustomed to seeing in the morning paper lists of casualties with these words, "When not otherwise stated, enteric," that we are coming to consider typhoid is a matter of course. But is it absolutely impossible that typhoid can be prevented, some times at all events? I have gathered, this afternoon, from what has fallen from men of experience who have been in South Africa, that it has been accepted as an inevitable thing, and that officers and others have not taken the proper precautions to guard against this terrible disease: and therefore, that whereas, the public are actually almost led to think that all these casualties from typhoid are natural, and cannot be prevented, yet in many cases they could have been prevented, and the list of casualties are in these cases to be regarded as due to the same class of shortcomings as those known to us as "regrettable incidents." If this lecture had been merely confined to the audience here this afternoon, perhaps it would not have a great result; but when any valuable views like these are brought forward in our lecture hall, I always ask the lecturer to think of the people who are not here, but who will read his lecture. Some 5,000 copies of what we have heard this afternoon will go all over the British Empire—5,000 copies are distributed in the Colonies and elsewhere, that being about the number of the issue of our JOURNAL. Dr. Canney has done great service in bringing to the notice and consideration of the whole of the Army, not only at home but abroad, and in our Colonies, through our JOURNAL, the extreme importance of the question, and the immense amount of responsibility which rests with someone or other in the prevention of typhoid; whereas at present, as he says, there is no personal responsibility; but yet, there is really an enormous amount of responsibility resting on all officers, from the Commander-in-Chief to the youngest subaltern, with regard to looking after the water supply of their men. I will ask you to allow me to return, on behalf of the Council, your thanks to Dr. Canney for the very able lecture he has delivered to us, and I have to thank very much those gentlemen who have taken part in the discussion.

INDIA: ITS FIGHTING RACES AND ITS ARMY.

PART II. OF A LECTURE.

(*Continued from p. 1356 of the November* JOURNAL, *1901.*)

By Lieut.-Colonel F. C. CARTER, Commanding 1st Royal Berks Regt. (Formerly D.A.Q.M.G. and D.A.A.G. Bengal, 1888 to 1894), Gold Medallist U.S. Institution of India.

Delivered at Gibraltar, 11th and 18th February, 1901,
Before His Excellency General Sir GEORGE WHITE, V.C., G.C.B., etc., and Officers and N.C.O.'s of the Garrison.

In my last lecture I told you something of the past history of India and its people before the advent of the European; something of the birth of our Indian Empire and of our struggles for supremacy with the Native chiefs and with the French; something of the commencement, progress, and ultimate strength of our land forces in that country, with a short description of each particular force in so far as the Native troops are concerned (Regular and Irregular), Imperial Service troops, Military Police, Frontier Militia, and Volunteers.

Now we will go rather more into detail as regards the organisation of each arm of the Native Army.

The Native troops in the four commands, viz., Punjab, Bengal, Madras, and Bombay, and those under the Government of India (that is, not including either Military Police, Frontier Militia, or Imperial Service troops), consist briefly of:—

41 Regiments of Cavalry and some Irregular Corps, such as the Deoli Irregular Force.
4 Field Batteries Artillery (Hyderabad Contingent).
10 Mountain Batteries.
1 Garrison Battery.
3 Battalions Sappers and Miners.
127 Battalions Native Infantry and some Irregular troops, such as the Meywar Bhil Corps.

Being a total of roughly 145,000 (or approximately double the number of European troops in India).

A regiment of Native cavalry consists of 4 squadrons, 1 commandant, 4 squadron commanders, 4 squadron officers, about 4 attached officers, and 1 medical officer, all European; of these, 1 is adjutant and 1 quartermaster, 4 risaldars (Native squadron commanders), of whom 1 is

risaldar major, 4 ressaidars (Native captains), 8 jemadars (Native subalterns), of whom 1 is woordi major (adjutant), 8 kote duffadars troop sergeant-majors), 56 duffadars (sergeants), including 1 farrier major, and 1 salutri (shoeing smith), 8 trumpeters, 536 sowars (troopers), including 1 assistant salutri, 16 farriers, and 8 camel sowars. Total 625 Natives.

The establishment of a Native mountain battery is 1 commandant, 3 subalterns (of Royal Artillery), 1 subadar (Native captain), 2 jemadars, 1 havildar major, 1 pay and quartermaster havildar, 6 havildars (sergeants), 6 naiks (corporals), 2 trumpeters, 88 gunners, 3 havildars of drivers, 6 naiks of drivers, 138 drivers, 1 farrier, 1 salutri. Total, 260.

The armament of all, except the battery in Burmah, is six 2·5 R.M.L. screw guns. This one battery has a slightly different establishment, and is still armed, I believe, with the old 7-pounder "pop-gun."

European mountain batteries have, in addition to the officers and gunners of Royal Artillery, 148 Native drivers and non-commissioned officers. They are also armed with the 2·5 screw gun, though I understand another mountain gun (a 10-pounder B.L. jointed gun, 400 lbs. cordite charge, M.V. 1,200-1,300 f.s.) is under trial.

A Native infantry battalion consists of 1 commandant, 2 wing commanders, 5 wing officers (of whom 1 is adjutant and 1 quartermaster), about 4 attached officers and 1 medical officer, 8 subadars, 8 jemadars, 40 havildars, 40 naiks, 16 drummers, 800 sipahis (privates).

Native officers are, as a general rule, promoted from the ranks by selection after having passed a qualifying educational test; though now and again, especially when new regiments are raised, commissions are given direct.

I should here add that the increase of British officers all through the Native Army is and has been for some time under consideration, and I believe at last there is really some attention being paid to this all-important question by the home authorities. Your Excellency will doubtless correct me if I am wrong.

His Excellency: "No; you are quite right, at least I hope and believe so. I may add that Lord Roberts himself fully appreciates the necessity of an early increase in the numbers of British officers serving with Native regiments." (His Excellency's remarks repeated to the audience.)[1]

A sipahi or sowar enlists for twenty-one years' service with the colours in India or beyond the seas, after which he is entitled to a pension. Subject to certain restrictions he can claim his discharge, or his commanding officer can get rid of him after three years. Lately a system of Reserves has been introduced, but the provisions were, when I left India in '94, more or less recent, and I am not prepared to say how they have worked.[2] The principle was that a certain percentage

[1] Since this lecture was given I have learnt that the number of officers has been and is still being increased. It varies also in different commands.

[2] I have since been told that the system is working excellently.

(25 per cent., I think) of sipahis were allowed to return to civil life after between five and twelve years' service with the colours, and form an Active Reserve, which is embodied for a month every year with one or more of the linked regiments; and a Garrison Reserve composed of pensioners, who were not liable to service outside India.[1]

I do not think, from what I gathered myself and from what commanding officers have told me, that the sipahis either understood or appreciated at first what the Government was aiming at. The Native's idea of soldiering is that he devotes the best years of his life entirely to it, and I fancy they thought that returning to their villages before their time might give the appearance of having been dismissed the Service. I know I had great difficulty in trying to make my orderly understand it. He was a well-to-do zemindar (landowner), whose father had just died, and his family were anxious for his return to his acres, which his commanding officer and I both persuaded him to do, but without effect.

A sipahi's pay is 9 rupees per mensem. (I see the text-book provided for instruction of British officers gives 7 rupees, but this is wrong.) Calculated at 1s. 4d. to the rupee, this works out at 12s. a month, or about 4¾d. a day, out of which, the soldier has to feed himself. He gets a full uniform on joining, and renewals at certain periods. He has to nominally build his own barracks and keep them in repair, for which hutting allowance is drawn; but this is too intricate a question to go into in this lecture. He also draws (what is dearly loved by all Native soldiers) "compensation for dearness of rations," which practically means that anything over 3 rupees 8 annas a month charged to him for rations is refunded. There are certain other deductions from the sipahi's pay, too complicated to go into here, but roughly he clears about 5 rupees (or 6s. 8d.) pay per month. This ration allowance, which has become a necessity owing to the rise in price of food-stuffs all over India, is by way of compensating the soldier for the consequent loss, his pay (when it was 7 rupees) having been originally calculated when *ata* (flour) was at about half its present *nerik* rate. Practically on this system all the Native troops are paid except the Punjab, Bengal, and Bombay Cavalry.

As regards the Native cavalry in the Punjab, Bengal, and Bombay, it is maintained on what is called the *Zilladar* system—that is to say, the sowar on joining finds everything himself: horse, saddlery, uniform, and sword—he also has to pay for feed and upkeep of his horse, the Government supplying him with carbine, lance head, and (I believe) pennon, and for this he draws 32 rupees per month (46s.), and, of course, as in the infantry, compensation for dearness of rations and hutting allowance, which latter is higher than in the infantry, to allow for extra cost of horse lines. This was the old system of raising irregular forces in different zillas, and the theory is still maintained, though in practice what it amounts to is that the young sowar recruit (who is as a rule a man of influence or means) pays to the regimental funds on joining a certain fixed sum (about

[1] I have since been told that the Garrison Reserve has lately been done away with.

250 rupees, or £16) and subscribes monthly to the Chunda Fund (about 2 rupees per month in most regiments, I think), and he is supplied with a horse, saddlery, arms, and accoutrements; his uniform, etc., he purchases from the regimental shop.

In rich regiments like the 11th and 19th Bengal Lancers (late Probyn's and Fane's Horse), which made their pile in the China War of 1859–60, the regimental funds are in a very flourishing state, and the men are splendidly mounted; in the 19th Bengal Lancers chiefly on "walers" (Australian horses), though the advantage for these for Native cavalry I have never been able to see, for the country-bred and Arab carry them perfectly well, and on service at a pinch will live on an odd blade of grass or two and a pinch of "bhusa" (chopped straw); while the waler, unless he gets his meals regularly, is apt to fall to pieces. The 11th Bengal Lancers have a horsebreeding farm of their own at Probynabad, and turn out a very good class of "C.B.'s," with a strain of English, Arab, Persian, or Baluch blood in them, and I hear that other regiments have lately started horse farms on the same lines. Other regiments that are not so wealthy buy their remounts from breeders and at horse fairs. The Remount Department of the Government of India owns a certain number of stallions whose services are obtainable by breeders to cover mares.

The late General Parrott started years ago at Karnal a horsebreeding establishment, and should have made it pay well, only he bred too fine, too much of the thoroughbred about his foals, and the farm became more or less a breeding establishment for race horses.

Bazaar funds and grass farms are also sources of income to cavalry regiments, all of which assist in keeping down the expenses of sowars.

As regards uniform, the Native soldier of all arms has a working kit of khâki and a swagger kit for ceremonial purposes, scarlet, blue, green, light blue, drab or yellow, as the case may be (the 1st Bengal Lancers, Skinner's Horse, are the "Yellow Bellies"). Off duty he does not wear uniform, but dons his mufti (desertion is almost unknown), and you will see in the afternoons, strutting through the bazaars, Sikhs, Pathans, Baluchis, and others, in all the splendour of their flowing robes, always magnificent, always tastefully arranged, and always spotlessly clean; for, mind you, the soldier of the Emperor in India is a man with a position to keep up, and be he sipahi or subadar, he considers himself (and rightly too) above the ordinary mortal.

They wear medals in mufti, but not on their breasts, but strung round their necks without the ribbons; and a man who can swagger about with two or three portraits of the Queen on his manly bosom is a "bara bahadur" (*i.e.*, great person) among his countrymen.

On this subject of medals, Egypt has unfortunately started a grievance with the native soldier, and I expect China will intensify it. He doesn't understand our system of medals; you see, for every frontier campaign—and most of their service is on the frontier—after his first he only gets what he calls a "4 anna clasp." A Sikh subadar once, in introducing his young brother to me, who had served in Egypt and on one frontier campaign, said:—"Sahib, he is a very fortunate youth; he possesses three

medals, has only been on service twice, and has never been wounded; whereas I, as your honour knows, have served in five campaigns, have been three times wounded, yet I have but one medal!"

Every British officer in the Staff Corps has to pass both lower and higher standard examinations in Hindustani before he is permanently admitted to the Indian Service. He has also later on to pass in the language used in his regiment, Pukhtu for Pathans and Baluchis, Parvatia for Gurkhas, Tamil for Madrassis, etc., but all words of command are given in English, and all instruction is according to the artillery, infantry, and cavalry drill books, which are published in English on one side and in the vernacular on the other.

I don't think Hindustani proper is a difficult language, especially when one is living in the country. Most Staff Corps candidates manage to pass the Higher Standard in from 6 to 18 months. The only real difficulty is the exercises, English into Hindi and Urdu, which the examiners are very strict about. Officers of European regiments, save those who hope for Staff employ, for which the H.S. is a *sine quâ non*, don't as a rule bother themselves about examinations; and their colloquial, though good enough for servants, is at times unwittingly apt to cause offence when they address Native officers or men of position. The British subaltern's Hindustani is all in the imperative; he is surrounded by many a servant to whom he saith go, and he goeth; come, and he cometh. On the rare occasions when "he cometh not" I am afraid the subaltern takes other means than the vernacular to make him come, which is really a thousand pities, though he won't believe it. Now there are various ways of saying the same thing in Hindustani, and one has to be careful when dealing with higher class Natives, *e.g.*, we'll say a Subadar wants to call a sipahi to him, he would say, "Oh, Hari Singh, idha aoao"; but to a Jemadar he would say, "Jemadar sahib, hier ana," using probably the infinitive; while to his colonel he would say, "Sahib, hazur ki parwasti, ap ke tashrif hier liye," which, being literally translated, means: "Sir, by your honour's kindness, will you be pleased to bring your highness' presence here?"

A distinguished friend of mine, whom I see here this evening, asked me the other day if I was going to tell you anything about recruiting in this lecture. I will try and do so briefly—I say briefly, because it is a very large and, just now, much discussed subject.

At first sight it would appear that in India there should be no recruiting problem, for, roughly speaking, we want only 160,000 Native troops (*i.e.*, including military police), and we have a population of 300,000,000 to supply them. If we were not so very particular and exclusive as regards our recruits, if the same class of men contented us now as contented Clive and Lake, we could increase our Army fivefold without much difficulty, for the Service of the State has a great charm for the Native. Gradually, however, since the Mutiny, a system has obtained of eliminating from our Army a large percentage of the older fighting classes and all the lower castes of Hindus; the result is, that we are now making fresh calls on Sikhs, Gurkhas, Pathans, etc., not only for service in India, but also for military police and for Colonial service abroad; and it is

beginning to dawn on the authorities that the whole recruiting system will require more consideration than has hitherto been given it.

Before 1891-92 the system of recruiting was practically twofold: first, by the commanding officer's "Umedwar" book, in which the brothers, sons, and cousins of influential zemindars and men in the regiment were entered for admission so soon as they attained manhood and there were vacancies—a system that still practically does most of the recruiting for some of the favourite regiments; and, secondly, recruiting parties under a havildar, who proceeded to the district whence the regiment recruited and collected suitable youths, had them passed by a doctor, attested at the nearest cantonment magistrate's office, and sent off to the regiment.

Since 1891-2, with the object of more effectually obtaining the best men of the most warlike classes, recruiting depôts have been established at various stations, and special officers have been appointed as recruiting officers for certain districts, *e.g.*:—

Peshawur	for	Pathans.
Amritzar	,,	Sikhs.
Sialkote	,,	Dogras.
Lucknow	,,	Hindus.
Gorakhpur	,,	Gurkhas, and so on.

Owing to the size of the districts, assistant recruiting officers were later on appointed from regiments to help the recruiting officers.

On the whole, the scheme has worked well, though many commanding officers are still of opinion that the old system was preferable.

There is no difficulty in recruiting just at present, but there might be, especially if from any reason recruiting beyond our frontier became, owing to war, impossible; and this is where the crux of the whole question comes in.

I am not alone in thinking that Army Head Quarters, India, take it too much for granted that *Pax Britannica* has destroyed the fighting instincts of many of the old warlike races of Hindustan. I allude more especially to the Rajputs, Indian Mahomedans and Mahrattas (for I do not believe that the lower classes like the Tamils, and Talingas, of Madras, and the low caste Chumars, coolies, etc., would ever be worth their salt as fighting men). We do not enlist Rajputs, Indian Mahomedans, and Mahrattas in anything like the numbers we could. You remember what I told you in my last lecture of the men who fought for us at Arcot, Palasi, Seringapatam, and Assaye? Well, these are the men whose descendants we now look on as the poorer fighting classes of India, who are supposed to have, to a great extent, turned their swords into ploughshares, though in reality I believe it is the Government itself that is assisting and encouraging the ploughshare by their neglect of these races, and by so seldom when enlisted sending regiments of this class on service. If we fostered the warlike spirit in these races—Sir Power Palmer, the present Commander-in-Chief, has made a good move in this way by his varied selection of regiments for China—there is no reason that I wot of why in time they should not again emulate the deeds of their forebears.

I believe that had we stopped recruiting Sikhs and forbidden Singhism, as Lord Lawrence actually did just before the Mutiny, which order, luckily for us, had to be cancelled because of the Mutiny and the assistance we wanted from the Khalsa, the Sikhs would also have lost their fighting instincts and sunk to the level of an Oudh ryot, whereas we have kept him well to the forefront, with the result that he is the finest fighting man in Asia.

Where I think the point is of such importance is that we are gradually neglecting the classes in India whom, in the event of a big war, we should in all probability have to enlist from to fill up the wastage. For instance, presume a prolonged war with Russia in which we met with reverses to start with across the frontier. This would certainly go badly with us as regards Pathans, Baluchis, and other trans-frontier tribes, and it might close the door of Nepal for Gurkhas. I do not think such a supposition probable; but with the surprises of 1899-1900 fresh in our minds, we should consider possibilities as well as probabilities.

In spite of the extra numbers of Pathans (Afridis, Orakzais, Khuttaks, etc.) now required by us, we have little or no difficulty in obtaining them. A Native officer wrote to me after the Tirah Campaign and said they had more Afridis than ever coming in to enlist, mostly from the tribes we had been fighting a month previously. The reason is that we were successful; had we failed, enlistments would have ceased and desertion begun. It is a curious, but a pleasing fact, that the tribes we have had the hardest knocks with before we conquered them, namely the Sikhs, Gurkhas, Pathans, and Baluchis, are the pick our of Indian Army now.

The classes we now enlist from are as follows:—

Bengal and the Punjab.—Brahmans, Rajputs, Jats, Dogras, Garhwalis, Gurkhas, Sikhs, Hindustani and Punjabi Mahomedans, and Pathans.

Madras.—Tamils, Talingas, other Madrassis, including Mahomedans, and a few Mahrattas.

In the Burmah Battalions.—Punjabis, Dogras, Rajputs, Sikhs, and Gurkhas.

Bombay.—Rajputs, Jats, Gujars, Mers, Mahrattas, Sikhs, Brahuis, Baluchis, Hazaras, Wazeris, Pathans, and Central India Mahomedans.

Thus briefly you will observe that nearly all the fighting men in all four commands come from the N.W. portion of the continent and from across the borders.

Now I know all these names are a bit puzzling to most of you, as is also the system of Hindu caste, so I will endeavour to throw a little light on some; but I cannot take all of the seventy-eight different divisions in India.

I will take the Hindus first, as they form two-thirds of the population.

When about 1000 B.C. the priests began to obtain a decided ascendency over the people in India, the population became divided, through their initiative, into four chief castes:—

1. The Brahmans, the priestly caste, the so-called heaven-born, who are noble by birth, whether they be kings or beggars.

and who are reverenced by the lower castes almost as though they were gods. These are they that wear the Brahmanical thread across their left shoulder.

2. The Kshatryas, or Rajputs, that is "sons of kings"; also nobles, but a degree lower than Brahmans. They are the fighting class.
3. The Vaisyas, or agriculturists and farmers.
4. The Sudras, or menial class, supposed to be the original inhabitants of the country before the Aryan invasion.

To these must be added yet another class, which is sub-divided into no less than thirty-six castes, which originated in this way. The four original castes before mentioned were by the Institutes of Menu strictly forbidden to inter-marry, and the offspring of a father and mother of different caste, no matter whether his father was a Brahman or a Rajput, became an absolute outcast—a pariah. These outcasts increased enormously, and to remedy this state of affairs (known as Burran Sunkur) some Hindu potentate decided, with the approval of the Brahmans, to convert all progeny of mixed unions into another class below that of Vaisyas, but above that of Sudras, which was sub-divided into various useful castes, such as workers in brass, iron, wood, leather, earthenware, carriers of water and hewers of wood, herdsmen, pig-keepers, boatmen, washermen, etc., hence the many castes we know and are accustomed to in India, such as Manjis, Bhistis, Gwalors, Dhobis, Gujars, Ghunaks, Mistris, Chumars, and many others.

The fact of a man being a Brahman or Rajput does not mean nowadays that he is a man of high worldly position: he may be a millionaire, he may be a beggar, he may be a priest, a prince, a tiller of the fields, a clerk, a doorkeeper, or a wandering mendicant; he must not do, however, what the native considers menial work. On the other hand, many rajas and princes are of very low caste. Salivahama, the great Mahratta chief (A.D. 1) was the son of a potter, and the ancestors of both Holkar and Scindia were Sudras, while that of the Gaikwar was, as his name shows, a herdsman.

Of all these many castes of Hindus proper (that is not counting Dogras, Gahwalis, Mahrattas, Jats, and Gurkhas, who are all Hindus by religion), the only ones we now enlist are the two highest, viz., Brahmans and Rajputs. Before 1891 many regiments like the 39th and 40th Bengal Infantry had an admixture (as suggested by the Royal Commission of 1858) of many of the lower castes. The result was not altogether satisfactory. I have myself seen Brahmans of the old 39th Bengal Infantry going off in a body after parade to wash their clothes and persons because they had touched a low caste sipahi at drill. The Brahmans would obey the orders of a low caste Native officer on duty, but more or less sullenly, while in the bazaar the low caste Native officer would make way on the road for his Brahman subordinate.

Regiments like the 2nd, 7th, and 11th Bengal Infantry, now composed entirely of Rajputs, are undoubtedly fine battalions, and have done

good service in Burmah and elsewhere, as I think His Excellency will admit.

The Rajput is a proud, somewhat haughty but brave soldier, and has fought for us from the days of Clive up till now. I do not think the Rajput of to-day, however, is quite so fearless of death as were his forebears, and he is not such a good man under reverses as some other of our fighting troops. His caste is also greatly against his roughing it with other troops on the frontier. You see a high-caste Hindu must strip to the waist and wash ere he can cook and eat his food. I remember in 1891, after three days' incessant rain and snow, a Hindustani regiment we had on service with us were in a very poor way, in fact, half starved. Then their water has to be carried in metal vessels instead of the usual "mushk" (if made of cow-hide), and it is only recently that the thousands of brass cooking utensils and lotas that used to be carried for Hindu regiments have been reduced, the Government insisting on men messing together on service. Caste does not fit in with modern active soldiering. However, there is no doubt that after a few weeks of active service their caste prejudices and rules do get rubbed off a bit, for caste, owing to war and civilisation, is undoubtedly dying in India, but by very very slow degrees; still the more we employ Brahmans and Rajputs on service the more we help to eradicate caste prejudices as they affect soldiering.[1] The Rajput, although he has become more of a man of peace during the last half century than heretofore, is a high-bred and courageous soldier; and coming as he does from an ancient race of warlike and chivalrous ancestors, he is a man not to be despised among our soldiery.

In the Jats we have another fighting race (according to Cunningham, half Afghan, half Rajput), of Hindu religion. A Jut, or Jat, means villager, rustic, and they are essentially of the ploughboy type, although they boast that their ancestors were numbered among the 36 Royal races of Rajputana. Not a very quick-witted man, nor should I say a very dashing fighter, though they are courageous and reliable men, and did very well in the Afghan War 1878-80, when the 14th Bengal Lancers (all Jats) distinguished themselves by their very gallant behaviour round Kabul.

The Dogra is a useful fighting man also, he too is of mixed race with Rajput blood in him. A smart, somewhat slightly built, but wiry hill man; rather of a retiring disposition, quiet and well disciplined; Hindu prejudices affect his life to a certain extent, but he casts them off on service with less qualms of conscience than the Rajput or Brahman. He comes from the neighbourhood of Sialkote and Jummu. We have enlisted Dogras lately more than heretofore, a brave race, and they can fight well.

I remember the first time a Dogra regiment went on service, and the first fight they ever had. I allude to the attack on our advanced post at Ghazikote in 1891, and a good fight they made of it too, though things

[1] I have since been told that in China they did to a wonderful extent throw off their caste prejudices.

got a bit mixed at times round the mosque as it was pitch-dark and hard to distinguish friend from foe. Our telephone communication from headquarters to this post was cut by the enemy, and the G.O.C. sent me when the firing became heavy to see what was up. When morning dawned we collected around the mosque alone 30 bodies of the enemy (all Chagarzai Ghazis) and more were left on the line of their retreat. Our losses, I'm sorry to say, included a very fine soldier, one of their most promising jemadars. There were no less than five Orders of Merit bestowed on the regiment in connection with this post and its defence, and I think they were all well won; for, although practically driven in by overwhelming numbers, they stuck to their post and eventually cleared the village.

The Mahratta is a mixture of Scythian, Aryan, and aboriginal blood. He is also a Hindu with Hindu castes, but is, or rather, I should say, has been, a nation to himself, a nation that at one time ruled the greater part of India. Now, Kolhapur, in the Deccan, is the only remaining pure Mahratta State in India, though Holkar, Scindia, and the Gaikwar are all Mahratta chiefs. The Mahratta is by nature a freebooter of predatory habits, but a fine soldier withal, and still inherits the equestrian aptitude of his forebears of the famous "Mahratta Horse," whose proud boast it used to be that they had watered their steeds at every river in India.

Now let us take a man you all hear most of, namely, the Gurkha, who, as you know, is recruited in Nepal. What is he? Well, to look at, you would say he was a curious admixture of Tartar, Chinese, and Hindustani. He himself will tell you that he is of pure Rajput descent, and can trace his ancestry to the old Rajput princes of Oudipur. As a matter of fact, I and many others do not believe him. Undoubtedly the Gurkhas (a Rajput race), who were driven out of India by the Mogul Empire, and who eventually, under Purthi Narain, conquered bit by bit the whole of Nepal, were of Hindu descent; but the race of Gurkhas, as we now know them, have a large percentage of Mongolian blood in their veins. Of the races in Nepal, the Newars, Bhotjas, and Lepchas adhere to the Buddhist religion, while the Magars and Gurungs profess Hinduism, though in reality it is much mixed with Buddhism. It is the last two castes we enlist under the general name of Gurkhas.

The Gurkha is, as you know, a fine, cool-headed fighter, a short, sturdy hill-man with a ready smile and cheerful countenance, not tied down with over much consideration for the rules and regulations of his Rajput ancestors. He is the "Greenjacket" of the Indian Army, and is clothed like our rifle battalions, in dark green with black belts Not quick at learning, and to those who know him not he appears at times dull, stupid, and phlegmatic, but he has ever been in the forefront of the Empire's battles, and has never failed to cover himself with glory and gore.

He is a bit of a savage at heart, and when his fighting blood is up he combines a good deal of cruelty with his bravery, though, do what you will, you cannot persuade him to see the error of his ways. In that pestilential country, Lushai, in 1889, owing to the dense undergrowth, the tribesmen managed at times to stalk up at night and stealthily

knife a sentry or two of our Native troops or a follower who had perhaps strayed from the stockade. There were no European troops employed up in those hills (N.E. Frontier) owing to the prevalence of malaria in its worst form. The Lushai's mania was head-hunting, so one night the General Officer Commanding requested his Staff officer to sound the officer commanding Gurkha battalion as to the advisability of sending out a Shikar party of Gurkhas to try and catch or kill the head-hunters. A smart havildar and three sipahis were selected; they said they would prefer to leave their rifles behind, and took only their kukris. At 4 the next morning the Staff officer was awoke and told that a Gurkha havildar wished to see him. The non-commissioned officer was beaming all over; "bahut atcha shikar, sahib," he said, adding with a grin that his colone sahib had sent him, and behind him were three smiling Gurkhas with two ghastly Lushai heads in a blanket. No one could well object; they had after all only done their job rather satisfactorily; but the officer wished the sportsman had left his trophies down the khud; anyhow, he was told to bury his "bag" before sunrise and to say nothing about it; luckily we were not much troubled with newspaper correspondents up there.[1]

The Garhwali is a hill-man from Garhwal in Kumaon, near akin to the Gurkha, in fact Kumaon, until after General Ochterloni's defeat of the Gurkhas in 1815 was part and parcel of Nepal. The 39th Bengal Infantry, which used to be a mixed Hindustani regiment when I knew them at Jhansi in 1888, are now a class regiment of Garhwalis. They are good men, I'm told, but I know little or nothing about them. I dare say if some of you met a Garhwali you would very likely mistake him for a Gurkha, as they are not unlike and wear the same sort of pork-pie caps.

From Baluchistan we obtain both Brahuis and Baluchis, both tribes being Sunni (orthodox) Mahomedans. The Sheea are the "heterodox," except of course to themselves, when they are the only "orthodox" section. To put it briefly, Sunni Mahomedans recognise the sayings (sunna) of Mahomed as supplementary to the Koran, and Abu Bekir, the father-in-law of the Prophet as Khalif in preference to Omar and Ali, the latter of whom married Fatima, daughter of Mahomed, and is recognised as a Khalif by the Sheeas. Hussin and Ali, who were murdered 680 A.D., were the sons of Ali and Fatima. The Brahuis are the dominant and aboriginal race, hospitable and generous; the Baluchis are nomadic freebooters, but make the best soldiers of the two. The Baluchis are of mixed descent, with a good deal of Tartar and Jewish blood in their veins, and are of finer features and taller than the Brahuis. They are brave good fighters; we know how well they fought against us

[1] It is only right, in justice to the gallant Gurkha, that I should add that an old friend of mine who has served for many years in a Gurkha regiment, on looking over this lecture, remarked as follows:—"I know it is generally believed that the Gurkha is a fierce devil when his blood is up, but after 23 years' service with them I have formed a very different opinion. I have heard about those 'heads' and other stories like it but I don't think the race can be judged by such."

in the Scinde War, and Sir Charles Napier was eulogistic as to their fearless bravery at Meanee.

Both tribes wear their hair long, often done in curls, and in their native attire, with skull cap, calico tunic, and full trousers fastened at the ankle, they present a fine picturesque and barbaric appearance, and would be invaluable as a troop of 40 thieves in a pantomime of Ali Baba.

Across the frontier only he who speaks Pukhtu is a Pathan (Paythan, as the British soldier calls him), be he Afridi, Orakzai, Khuttak or what not, though generally speaking every Afghan is called a Pathan. This is a full-length portrait of an Afridi Pathan (portrait exhibited here by lecturer), a piper of the 40th (Bengal Infantry) Pathans, a regiment which was converted in 1891 from a mixed Hindu regiment into a class regiment of (all) Pathans, as which it still figures in the Indian Army List, but which I believe has been again quite lately made into a class company regiment of Pathans, Sikhs, Punjab Mahomedans, and Dogras. I mention this, as it is somewhat interesting when considered along with my remarks in my first lecture on the resuscitation in 1891 of class regiments and the diverse opinions on the measure.[1]

This piper is, I consider, a typical Afridi. You'll observe his "kiss-me-quick" locks, not unlike those of an Espada of the Ring. The Afridis are first-rate pipers. All wild hill-men, you know, play the pipes, be they Pathans, Gurkhas, or Cameron lads, though their instruments vary from the Highland pipes of Scotland with a bass and two tenor drones, to similar pipes with only one bass drone down to the Eastern "sernai." The music of all is equally sweet and hard to distinguish. I have known Scotsmen scoff at this notion; but then I have known them so often mistake one for the other, that I fancy it must be the case; some of the Afghan melodies are not unlike those with which the Cameron lads soothe our troubled spirits here, though really, without chaff, the Afghan air (the polite name of which is "zakhmi dil," the "wounded heart") runs some of Scotland's sweetest melodies very close.

The Pathan is also a Sunni Mahomedan, but his religion is fanatical to a degree, and when he swears himself as a "Ghazi" whose sole aim is extermination of the Kafir (we are the Kafirs generally), I think the material form of his belief greatly assists him in meeting death so fearlessly, for the Mullah tells him that the faithful who die fighting for the cause are taken straight to heaven, where their immediate wants are attended to by at least 30 beautiful maidens.

It has been said of the Pathan that "nothing is finer than his physique, nothing worse than his morals," but nevertheless he is undoubtedly a fine soldier, though you cannot trust him very far out of sight, and he requires a firm hand over him. He loves fighting, and has fought for us right well on several occasions, though he has been known

[1] Since this lecture was given I have been told with reference to my remarks on purely class regiments as re-organised in 1891 that "a further change is now in operation: several class regiments composed since 1891 of classes that have proved unsuitable for that formation are being re-organised as class double-company regiments of different races," this therefore bears out my remarks on the subject.

to desert and betray his employer on service more than once. You all remember the Peiwar Kotal incident; I myself know of more than one. Still, these are but the black sheep of the fold, and we must not tar them all with the same brush, for as a rule the Pathan has been true to his salt (rimak halal), even when fighting against his own kith and kin on our behalf—a rather high test, you must admit, even for the most mercenary of soldiers. You've probably heard the story, a true one, of the sipahi on an advanced post being told by his British officer to try and pick off a Pathan behind a rock who was doing good execution with his rifle, and who replied, "Sahib, I've had several shots, but cannot hit him. I think it must be kismet. The man is my brother; but I'll try again."

Once out with my escort, as Field Intelligence officer, we had a parley with the enemy. The uncle of a Naik of my party happened to be the enemy's envoy. Two hours after they were shooting at each other.

The Afridi Jirgas (councils) that came in during the Tirah War to try and make better terms, generally numbered at least one greybeard with a medal or two of the Queen's round his neck, as there were lots of old soldiers fighting against us in '97; for although while in our active pay they will be faithful to their salt, when their time is up and they retire to the mountain fastnesses, they will throw in their lot with the tribesmen against the infidel, though it must be admitted that their influence at tribal councils has often been in favour of their old masters.

It used to be said by our neighbours here in Spain that "a contrabandista of Andalusia is unworthy of the name unless he can conceal himself behind a brick." Well, the same may be said of the Pathan, only with him it must be a pebble or a blade of grass; and many a British sentry on the frontier has felt the Afghan blade between his shoulders ere he knew the snake-like form of his foe was within 100 yards of him.

As a fighter, when things go well, when "forward" is the word, the Pathan has all the *élan* of a French soldier of the First Empire, all the courage of a Tamerlane, the agility of a cat, and the fierceness of a tiger; but when things are not so rosy—well, there are some other races I prefer.

In addition to these classes and tribes, we have the Mahomedans of all India (the Mahomedan population of India proper is fifty-seven millions), commonly divided as regards recruiting into divisions such as Punjabi Mahomedans, Hindustani Mahomedans, Rajput Mahomedans, Madrassi Mahomedans, Deccani Mahomedans, etc.; the descendants of Afghan and Mogul invaders and of those Hindus who, during the Mogul period, embraced Mahomedanism. In religion akin to their co-religionists trans-frontier, but by no means so fanatical, while Hindu customs have to a certain degree permeated their lives. Good soldiers they make, intelligent and trustworthy. Perhaps the Punjabi Mahomedans are preferred to those of Hindustan and down country as being the braver. Few regiments have better fighting records than those containing Punjabi Mahomedans, and certainly *Pax Britannica* has not eradicated

the fighting instincts of the followers of the Prophet in the Land of the Five Rivers. The Punjabi Mahomedan still holds his own with the best of our Asian fighting men, while as regards the other Mahomedans of India, though they are undoubtedly good, smart, clean, and reliable fighting men, I think they have lost some of the dash of their ancestors, which dash, I am of opinion, could be brought back—it is still in the blood—if we enlisted and employed on active service more of the race.

I have left to the last what I consider the first of our fighting men in Asia—the Sikh, the type of all that is noblest and best in a soldier and a gentleman. No finer foe ever crossed swords with British soldier than he of the Army of the Khalsa, and no better fighter has ever died for his Empress than the Sikh who affixes the title of "singh" (soldier) to his name.[1]

The Mahzubi (commonly called Muzbi) Sikhs, are a lower class of Sikh, descendants of Mahomedan and low caste Hindu converts. They are sound good fighters and excellent pioneers. The 23rd Bengal Infantry (Pioneers) are composed entirely of Mahzubi Sikhs—but the mainstay of our Indian Army are the Sikhs proper.

Now, some of you may ask, What is a Sikh? ("Sik" is the correct pronunciation). I will tell you. A Sikh is, as the term implies, one who learns, a disciple or follower. They are the descendants of those who in the sixteenth and seventeenth centuries A.D. followed the reformed Hindu religion as preached by Nanak, Govind Singh, and others. A Sikh, though born of Sikh parents, is not actually a "Sikh" himself until he has taken the "pahul."[2]

Nanak was born in 1469. He was a Hindu of the once warlike Katri caste. Like Buddha of old, and Rama Chund of Benares, he preached the true religion of Brahma and aimed at the emancipation of the people from priestcraft and idolatry, and the worship of one invisible God. He was followed by many other Gurus (teachers), but it was left to Govind Singh (son of Teg Bahadur Singh, who was murdered by Aurungzebe, the Mogal Emperor) to form the Sikhs into a real commonwealth (Khalsa) about 1680, and they remained a nation by themselves, with head-quarters first at Amritzar, then at Lahore, until the "*Khalsa* of the Lion of the Punjab" eventually gave way to the Queen of England, after the battles of Chillianwalla and Gujrat, in the second Sikh War of 1849.

[1] *Singh* means literally a "lion," and metaphorically a "champion" or "warrior."

[2] "*Pahul* means literally a 'gate,' a 'door,' and thence 'initiation.' The essentials of the *Pahul* are that five Sikhs at least should be assembled, and it is generally arranged that one of the number is of some religious repute. Some sugar and water are stirred together in a vessel of any kind, commonly with a two-edged dagger, but any iron weapon will answer. The novitiate stands with hands joined in an attitude of humility and supplication, and he repeats after the Elder the main Articles of his Faith. Some of the water is sprinkled on the face and person and he drinks the remainder and exclaims 'Wah Guru.' Sikhs are not ordinarily initiated until they reach the age of discrimination and remembrance, or about seven years old."—CUNNINGHAM.

At Lahore we now have a Chief's College, which in my time was under the supervision of Sir Benjamin Bromhead, a fine old soldier, who had been badly wounded on our frontier, and that is where the youths of the Sikh aristocracy are educated nowadays.

It was Govind Singh who abolished caste in the *Khalsa*[1] (Sikh community). It was he who first instituted the germ of the Sikh Army which later, under Jassa Singh, in 1748, became such a power in the Punjab. It was he who wrote the Tankha Nameh, or Book of Rules, which instituted the bathing pilgrimages to the Sacred Tank at Amritzar, where the Golden Temple still stands, the reverence of the Grunth (or Sikh Bible), which is still carried with pomp and ceremony in all Sikh regiments; the wearing of uncut hair, the frequent combing and cleansing of the same, the wearing of steel on the person (you may have noticed the steel representation of a quoit on or around the puggris of Sikh infantry battalions, which quoit used to be an implement of war, and the throwing of which is still an event at Sikh games); the forbidding of the use of snuff, tobacco, and spirits, and the practice of charity. 1764 saw the consolidation of the Sikh power, and in 1799 Runjit Singh reigned at Lahore; he died in 1839.

Thus you will see that, unlike though they seem to the Hindus of India, the Sikhs are but a young nation, but a recent offspring from the Hindu religion, though as warriors and chiefs they are far far above the caste-ridden followers of the unreformed Hindu religion.

Splendid horsemen as were the old Sikh horse of the forties, good shots, of fine features and clean proportions, tall and active, proud, but not overbearingly so like the Rajput or Brahman (you saw two good specimens of the Sikh soldiery in the Duffadars who accompanied the Commander-in-Chief, Lord Roberts, on his visit here); they are, I think (not excepting even Gurkhas), *facile princeps* of our Indian troops. Who is there who has fought alongside the Sikh who does not admire his sterling qualities? Personally, I myself have been in a rather hot corner with Sikhs, and my admiration for them is immense.

Who has not heard of the little garrison of Sikhs on the Samana, who fought bravely on until but one was left to guard the bodies of his comrades, the flag of Great Britain, and the honour of his race, when he himself fell, the last of that little band of heroes?

Who has not heard of the wounded Sikh subadar at Chitral, who in the darkest moments, when relief seemed almost impossible, cheered up the rest with the remark that "Although the Sirkar's arm was slow in moving, it was far-reaching and sure," and fought on bravely in spite of his wounds, until he dropped from sheer exhaustion?

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[1] *Khalsa* or *Khalisa* is of Arabic derivation and has such original and secondary meanings as "pure," "special," "free."

"Khatri, Brahman, Sudra, Veisya, whoever remembers the name of God, who worships Him always, etc., shall attain salvation."—*Ram Das, Bilâwul.*

"The four races shall be one,
All shall call on the Guru."
—*Govind in Rahet Nameh.*

To see a Sikh at his best one should see the last company of a rear guard (I'm thinking of a Sikh battalion on the frontier) in rather a tight place, and one can but admire their unswerving discipline, devotion, and fearlessness.

Were I to tell you all I know about the *K'halsa* and its warrior disciples, I should go far beyond the limits of my lecture, for, to me, he is the ideal of a fighting man, a kind courtly gentleman, brave to a fault, and no matter whether the war trumpet rings with seeming sounds of defeat or with clarion notes of victory, the Sikh has ever been the same, true as the steel he wears, true to his officers, true to his Empress, true to the faith of his fathers, aye, true, true till death!

So much for the characteristics of some of the fighting races of our Indian Army. There is, however, one more powerful and valuable characteristic of all Native soldiers that I must mention, and that is their unbounded admiration for and belief in their British officers; and I am not surprised. The Staff Corps officer is as fine an example of a British officer as can be found anywhere, his bringing up is perhaps better than ours in the British service (where we are only now beginning to get rid of the poisonous system of apron strings), for he, from his youth upwards, has to act on his own, ofttimes in matters of grave importance; how well he has done so, even in the case of subalterns suddenly called to command their regiments on an isolated post on service, events of recent history tell us; and it is only proof of the soundness of the Native soldier's admiration for his British leader.

My lecture must now close. I had hoped to tell you something of the training of this Army and the system of district concentrations, and camps of exercise; something of Staff work in India in peace and war, and something of the system of transport, which is not wholly without interest; but I have already monopolised more of your time than I should have, and so I will now close. Thanking Your Excellency and the officers and non-commissioned officers for their kindly attention to my remarks, and hoping that I may have been instrumental in some small way in instilling into some of you a still greater interest in India, our chief (I was almost saying our only real) training ground, its people, its fighting races, and its modern Army—an Army that has under successive chiefs been kept up to such a state of efficiency and preparedness that it has never failed us yet, nor, please God, will it ever do so; but, when the blast of war again blows in our ears, whether a hurricane from off the shores of civilisation or a breezy zephyr from the recesses of our rugged borderland, it will be found ready and strong as ever to uphold the honour and glory of the Empire, and the noblest traditions of the Army in India.

"GOD SAVE OUR KING THE EMPEROR."

NAVAL NOTES.

HOME.—The following are the principal appointments which have been made: Rear-Admirals—G. T. H. Boyes to be Director of Transports; Burges Watson to be Second-in-Command of the Mediterranean Fleet; J. L. Hammett to be Admiral-Superintendent of Malta Dockyard. Captains—R. A. J. Montgomerie, C.B., to "Charybdis" and as Commodore second class during the Newfoundland Fishery season; E. H. Gamble to "Impregnable"; A. C. Clarke to "Prince George"; J. E. C. Goodrich to "Resolution"; F. S. Inglefield to "Royal Sovereign"; T. G. Greet to "Rainbow"; E. P. Ashe to "Pearl."

Rear-Admiral G. T. H. Boyes, a retired officer, succeeds Rear-Admiral Sir Bouverie F. Clark, K.C.B., as Director of Transports. Rear-Admiral Burges Watson, M.V.O., will succeed Rear-Admiral Lord Charles Beresford, C.B., as Second-in-Command of the Mediterranean, his place as Admiral-Superintendent of Malta Dockyard being taken by Rear-Admiral J. L. Hammett. Admiral Sir W. Kennedy, K.C.B., struck his flag on the evening of the 1st ult., and the flag of his successor in the Sheerness command, Vice-Admiral A. H. Markham, was hoisted the same day. The third-class cruiser "Proserpine" arrived from the West Indies at Plymouth on the 2nd ult., and will pay off at Chatham; on the same day the second-class cruiser "Iphigenia" arrived at Portsmouth with relieved crews from the Mediterranean. On the 7th ult. the third-class cruiser "Pandora" commissioned at Portsmouth for the Mediterranean, where she will relieve the new obsolete sloop "Melita." On the 10th ult. the new sloop "Shearwater" left Sheerness for the Pacific. On the 17th ult. the first-class battle-ship "Resolution" commissioned at Portsmouth for coast-guard service at Holyhead, where she takes the place of the second-class battle-ship "Colossus." On the 26th ult. the third-class cruiser "Fearless" and the new sloop "Rinaldo" commissioned at Sheerness for China, and on the 28th ult. the new sloops "Vestal" and "Mutine" commissioned at Chatham for the same station. On the 22nd ult. the first-class cruiser "Amphitrite" left Chatham for China with relief crews for the "Alacrity" and "Snipe," which will pay off at Hong-Kong and recommission.

Launch.—On the 13th ult. the new first-class armoured cruiser "Monmouth" was launched from the yard of the London and Glasgow Shipbuilding and Engineering Company. The launch had been postponed from the previous day owing to the severe weather, and was performed without ceremony. The "Monmouth" is of the same class as the cruisers "Essex" and "Kent," particulars of which have appeared already in the JOURNAL. She is 440 feet in length 66 feet in breadth, and has a draught of 24½ feet, with a displacement of 9,800 tons. She has a partial water-line armour belt, beginning about 120 feet from the stern and continued forward to the stem, 4 inches thick, tapering to 2 inches forward, while the coal bunkers along the sides, afford additional protection. She has an extreme coal capacity of 1,600 tons. Her armament consists of two 6-inch Q.F. guns forward and aft in barbettes, four 6-inch Q.F. guns in casemates on the upper deck and six similar guns in casemates on the main deck, eight 12-pounder 12-cwt. guns, two 12-pounder 8-cwt. boat and field guns, three 3-pounder Q.F. guns, and 8 Maxims. In addition, the "Monmouth" will be fitted with two submerged tubes, one on either side, for the discharge of 18-inch Whitehead torpedoes. Her engines will develop 22,000-H.P. and give a speed of 23 knots. The complement of officers and crew will be about 700.

Destroyers.—Parliamentary Return.—A Parliamentary return recently issued gives the names of the various torpedo-boat destroyers built for the Admiralty, the dates on which they were ordered, and of whom, the dates when they were launched, the number of official trials to which they were subjected, and the dates when they were accepted by the Admiralty, or, in the case of unfinished boats, the expected date of delivery; also the number of preliminary trials of boats of 30 knots or over, and particulars of typical cases where those trials have been exceptional in number and have extended over considerable periods.

The return includes the names of 113 boats, of which 19 were built by Messrs. Laird Brothers, of Birkenhead; 16 by Messrs. Thornycroft, of Chiswick; 16 by the Palmer's Company, of Jarrow; 12 by Thomson's, of Glasgow; the Clydebank Company, or J. Brown & Co., Clydebank; 9 by Messrs. Hawthorn, of Newcastle-on-Tyne; 9 by the Fairfield Company, of Glasgow; 8 by the Naval Construction and Armaments Company, of Barrow, or Messrs. Vickers & Co., of Barrow; 6 by Messrs. Doxford & Sons, of Sunderland; 5 by Messrs. Yarrow, of Poplar; 4 by Earle's Company, of Hull; 3 by Messrs. Armstrong & Co., of Newcastle-on-Tyne; 3 by Messrs. J. S. White & Co., of Cowes; 2 by Messrs. Hanna, Donald & Wilson, of Paisley; and 1 by the Thames Ironworks Company, Blackwall.

Some of the trials were remarkably protracted. Those of the "Conflict," built by J. S. White & Co., Cowes, lasted from 16th August, 1895, until 9th June, 1898; those of the "Teazer," by the same firm, from 3rd January, 1896, to 22nd March, 1898; those of the "Wizard," by the same firm, from 19th May, 1897, to 5th May, 1898. In each of these cases the delay was principally due to "alterations to obtain speed." Those of the "Fervent" lasted from 23rd August, 1895, to 4th August, 1899, and those of the "Zephyr" from 13th March, 1896, to September, 1900. In each case delay occurred through the substitution of water-tube boilers for locomotive boilers during the trials. The builders were Hanna, Donald & Wilson, Paisley. The trials of the "Zephyr," by the Thames Ironworks Company, were protracted from 16th December, 1895, to March, 1897, by the necessity of renewing the boiler tubes. The trials of the "Otter" (Vickers, Sons & Maxim) lasted two years and a quarter through "alterations to propellers to obtain speed," and fracture of both crank shafts. The "Brazen" (Clydebank Company, Glasgow) was three years and a half under trials, owing to her inability to obtain speed, and she was finally accepted at 29¼ knots. The "Express," tendered by Laird Brothers, Birkenhead, for 33 knots, had made 27 preliminary and 10 official trials between 20th October, 1898, and the date of the return (17th August last), but had been unable to realise the speed. The "Albatross" (Thornycroft) was 18 months under trial, and was then accepted half a knot under the specified speed. A number of shorter trials, yet extending to the best part of a year, were spun out by the difficulty of attaining the contract speed, and in several cases the vessels were finally accepted at a less speed. The ill-fated "Viper" underwent two official and three preliminary trials, and the "Cobra" two official trials only, but in neither case are any notes given of their performances. Of the later boats, in addition to the "Cobra," the "Petrel," "Kangaroo" (Palmer's Company), "Thorn," "Tiger," and "Vigilant" (J. Brown & Co., Clydebank) were purchased while building.

The Parliamentary paper in question is calculated to convey a somewhat erroneous idea to the lay mind. The paper throws, perhaps, undue emphasis on the fact that the great majority of the 30-knot destroyers were unable to attain the speed for which they were designed, and some of them had to be accepted as boats of less speed than 30 knots. The fact is likely to be overlooked that the Admiralty, in giving out contracts for boats of this class, make certain stipulations and then leave the designs entirely to the judgment of the contractors. If, then, the boat fails to attain her speed, it is not through any miscalculation or error of judgment on the part of Admiralty officials, but to the inexperience of the contractors who design and build the boats. There is nothing startling in the disclosure that a 30-knot boat never reaches that speed after she is in commission, and the causes are so well known that it is hardly necessary to point out that when on trial a destroyer is at least 100 tons lighter than when she goes

to sea under the pennant. On the whole the return is interesting, though it need not be alarming.

The Gun Trials of the "Vengeance."—The new first-class battle-ship "Vengeance" carried out her gun mounting trials at Portsmouth last month, after several daily postponements in consequence of the fog. The "Vengeance" is the first battle-ship built by Messrs. Vickers, Sons & Maxim, and she is also the only ship in the British Navy which has been built, engined, armoured, and supplied with her heavy gun mountings by one firm. She was ordered 12 months later than her five sister vessels, the "Canopus," "Goliath," "Ocean," "Albion," and "Glory," and Sir William White, profiting by his experience in the interval, was enabled to effect some important improvements, such as better speed, greater protective strength, and a higher offensive power. The chief difference, however, between the "Vengeance" and her predecessors of the "Canopus" class is the new type of heavy gun mounting, by means of which the 12-inch guns can be loaded at all firing positions, whether of training or elevation. The "Vengeance" is also the last ship to be supplied with the Mark VIII. Woolwich guns of 46 tons and 36 calibres in length, which, though not so powerful as the Vickers Mark IX. of 40 calibres, is still a formidable weapon, as it fires a projectile of 850 lbs. in weight with a muzzle velocity of 2,367 foot-seconds and a muzzle energy of 33,000 foot-tons. A complete broadside from the "Vengeance" would bring into action four 12-inch, six 6-inch, six 12-pounder, and six Maxim guns. These 22 guns would fire at one time 11,000 lbs. of metal with a collective energy at the muzzle of over 600,000 foot-tons. An important advantage afforded by the new mounting is that, while the gun can be kept sighted on the object aimed at, the gear is simplified rather than complicated, as there are no locking bolts nor apparatus for working them. All the loading operations are carried out by hydraulic power, but simple fittings have been provided for the use of hand-power as an alternative. In the forward turret three rounds were fired from each gun with practice and service charges from 10° before to 10° abaft the beam. The last two rounds were fired simultaneously, one gun being at the maximum depression and the other at the maximum elevation, but no damage was sustained beyond the breaking of a few glass fittings. In the after turret four rounds were fired from each gun to ascertain the maximum rate of fire obtainable with the type of loading gear, but the conditions of firing were a slight modification of those observed in the "Irresistible." The results were regarded as highly satisfactory, as it was shown that with a trained crew and the machinery operated under ordinary working conditions a rate of two rounds a minute could be maintained for a prolonged period.

Before the testing of the heavy gun mountings, all the small weapons were subjected to the trials with satisfactory results, and as the vessel has carried out her torpedo and circular trials, she will now be completed for sea.—*Times* and *Naval and Military Record.*

FRANCE.—The following are the principal promotions and appointments which have been made: Capitaines de Vaisseau—L. Borel de Brétizel to be Rear-Admiral; L. J. Lormier to "Formidable"; J. J. De Percin to "Indomptable." Capitaines de Frégate—L. J. Lormier, T. H. De Miniac, and C. X. Ridoux, to Capitaines de Vaisseau. —*Journal Officiel de la République Francaise.*

New Ships and Dockyard Notes. Cherbourg.—The preliminary trials of the coast-defence battle-ship "Requin" after her re-construction have been satisfactory. Her new Niclausse water-tube boilers, which are to develop 7,000-I.H.P., or 1,000-I.H.P. more than her old cylindrical ones, worked satisfactorily at 4,500-H.P., and it is expected that the other trials will give as good results; among other improvements has been the removal of the torpedo-tubes from the centre of the battery and their replacement by two 3·9-inch Q.F. guns; while the armour belt is now much higher out of water, instead of as formerly the upper edge of the belt being only an inch or two above the water; her armament now consists of two 10·8-inch guns in closed turrets, one forward and one aft; six 3·9-inch Q.F. guns in the central battery, four of which are

mounted at the four angle ports respectively, eight small Q.F. guns, and 12 machine guns.

Orders have been issued for the coast-defence battle-ships "Valmy" and "Bouvines" to proceed from Brest to Cherbourg, where they are to be placed in dockyard hands to have bilge keels fitted.

The new torpilleur-de-haute-mer "Bourrasque" has arrived from Havre, where she was constructed by the Forges et Chantiers de la Méditerranée, having averaged 27 knots on the passage round. She is somewhat different from the "Siroco" class, being lighter and faster, having a speed of 29 to 30 knots, as against 26 knots of the earlier vessels; on the other hand, her radius of action is less than that of the "Siroco," being only 2,000 miles at 10 knots speed as against the 2,500 of the latter, and she only carries two torpedo-tubes instead of three. The *Yacht* holds that the earlier vessels are the best. The "Typhon," another new boat, has beaten the record, having come round from Havre, covering the distance, 72 miles, in 2¼ hours, a speed of 32 knots.

Brest.—The new first-class battle-ship "Iéna" is still in the dockyard hands, her turrets not yet working quite satisfactorily, and her wireless telegraphy fittings not having yet been installed; it is hoped, however, that she will now soon be ready to start for the Mediterranean. The first-class cruiser-corsaire "Guichen" has been placed in the Reserve, while the necessary repairs, which are to be hurried on, are in hand; the authorities are anxious to have the ship ready for service again, owing to the long delay in getting her sister ship, the "Chateaurenault," satisfactorily through her trials, while it will be also some months before the necessary repairs and alterations in the boilers of the new armoured-cruiser "Jeanne d'Arc" will be completed; since she has been in commission, the "Guichen's" engines and boilers have worked well; with the latter, which are of the "D'Allest" type, no trouble whatever has been experienced. The contract for the construction of the new harbour for the torpedo-boats of the *Défense-Mobile* has been given to a Paris contractor, and the work, which will cost 7,600,000 francs (£304,000), will be commenced at once. When completed the considerable space now occupied by the boats in the mercantile harbour will be available for other purposes; barracks are also to be constructed for the crews of all the submarine defences as well as for the boats of the *Défenses-Mobiles*. Two new large dry docks are also to be constructed near the Observatory of the Naval School.

The new first-class battle-ship "Suffren" is having her guns mounted with unwonted rapidity. This ship presents a much more workmanlike appearance than most of her predecessors, the heavy superstructures and cumbrous bridges being considerably reduced.

Toulon.—The new first-class armoured cruiser "Montcalm" has been carrying on her trials successfully off Toulon, and during her last run at full speed over the measured mile off the Hyères Islands, with the engines developing 20,378-I.H.P., the ship averaged a speed of 20·3 knots, the I.H.P. developed being 800-H.P., in excess of the contract; when ready for commissioning the "Montcalm," according to present arrangements, will take the place of the "Dupuy de Lôme" in the Northern Squadron, which ship will then be paid off for general repairs and to have water-tube boilers substituted for her cylindrical ones; these will be of the Normand-Sigaudy type, similar to those in the "Montcalm."

The coast-defence battle-ship "Indomptable" commissioned on the 1st inst., after her reconstruction, for her trials; she has received water-tube boilers of the Niclausse type, a new armament, and closed turrets instead of the old barbettes.

Torpedo-boat No. 256 was launched at Havre on 29th November; she is 37 metres long, and 4·30 metres wide, and has a displacement of 90 tons; her engines are of 1,800-H.P., and speed 24 knots. The armament comprises two 37-millimetre Q.F. guns, and there are three above-water torpedo-tubes. Her complement is fixed at 2 officers and 21 men.

Religious Service on board Ships.—The decree of 20th May, 1885, with regard to religious services on board ships of the Navy has been modified by a further decree recently published in the *Journal Officiel*, cancelling obligatory attendance at mass and

prayers, and ordering that the mass flag is not to be hoisted in future during service in place of the ensign. In consequence of this decree the *Moniteur de la Flotte* states that the following alterations will be made in the religious service on Sundays: the mass flag will no longer be hoisted, but on Saturdays a general signal will be made notifying the ship on board which the service will be held; the attendance of the crew is optional, but, nevertheless, perfect silence is to be observed on board during the celebration of mass. The guard will not attend mass officially as formerly, but will give the regulation salute on the arrival and departure of the admiral. In no case is the dinner hour of the crew to be postponed should the service not be concluded in time.

Bearing on this religious question in the Navy a petition, to which are attached 8,000 signatures, has been presented to the Chamber against the suppresion by M. de Lanessan of the ceremonial customs hitherto observed on board ships of the Navy on Good Friday. It has been considered by, and submitted to, the Chamber by the Commission on Petitions on the grounds that though no decree or regulation can be discovered authorising these ceremonies, that, nevertheless, they are very ancient customs observed by all Roman Catholic Navies, and that, as three-fourths of the *personnel* of the Republican Navy are Bretons and sincere Roman Catholics, it is unwise to wound their religious susceptibilities.

The Naval Estimates for 1902.—The commission of the budget has refused the credits asked by the Minister of Marine for the armoured cruiser A12, and the two new battle-ships A13 and A14, of the new programme to be commenced in 1902. The refusal of the commission might have been thought due to some objection to the design, but this is not so, as the credits for an exactly similar armoured cruiser to A12, viz., A11, have been approved; the reason is said to be the small sums asked for these ships in the budget; 13,000 francs only being put down for A12, which represents only the 500th part of the total cost of the hull; thus the commission found itself asked not to provide funds for the construction of these vessels, but to sanction engagements entailing an expenditure of 110 millions of francs (£4,400,000), which is the total cost of the three, and this it declined to do. It is probable, however, that the Minister of Marine will sustain the original demand before Parliament. The programme has been decided upon after full discussion and agreed to by a large majority in the Chamber and by the Senate unanimously, and it is almost impossible to carry it out unless the Navy has the necessary funds in time to prepare for these constructions. Slips capable of building 15,000 and 12,500-ton vessels are rare in France, and it is necessary that the Navy should be in a position to use those that there are directly they become vacant.—*Le Temps* and *Le Yacht.*

Submarine Boats—The *Armée et Marine* passes in review the position with regard to French submarine boats. Before the Budget of 1900 there were 12 of these boats either finished or in hand; those finished were the "Gymnote," "Gustave Zédé," "Morse," and "Narval," and those in hand the "Français," "Algérien," "Farfadet," "Gnome," "Korrigan," "Lutin," "Sirène," and "Triton." Two more, the "Silure," and "Espadon" were provided for in the Budget of 1900, bringing the number up to 14 boats which will be in commission at the end of this year. The Budget of 1901 made provision for 20 others, which have been already laid down, and three which are to be commenced shortly. The 20 are of what is known as the defensive class. Their displacement is 68 tons, length 77 feet, beam 7½ feet, and draught 8 feet. Their electric motors, served from accumulators, give them a speed of 8 knots. They each carry one officer and four men and will cost £14,616, which is less than any previous submarine boat. The three will be of the offensive class; the first will be built at Cherbourg, after the plans of M. Romazotti, the builder of the "Gustave Zédé" and the "Morse." She will cost nearly 20,000. The cost of the second, which is to be built at Rochefort, after the plans of M. Mangus, the designer of the four submarines of the "Farfadet" type, is estimated at nearly £32,000; while the third which is to built at Toulon, after the designs of M. Bertin, will cost nearly £37,000. No submarines will be laid down in 1902, but in 1903 five will be put in hand at Toulon, and in 1904 no less than 26 will be commenced—eight at Rochefort, ten at Cherbourg, and eight at Toulon. These will

all be finished by the end of 1906, when the French fleet of submarines will consist of 68 boats, 37 of which will have been put in commission before the end of 1903. This year the total *personnel* numbers only 10 officers and 141 men with maintenance expenses amounting to £12,000, while next year it will rise to 27 officers and 306 men with an expense of £34,000. The submarines have been detached from the other vessels of the mobile defence and formed into three groups, each under the command of a captain of the second class. The three stations are Rochefort, Toulon, and Cherbourg. At Cherbourg the boats are the "Français," "Algérien," "Morse," Narval," "Sirène," and "Triton. It is proposed to carry out some comparative experiments between boats of the "Narval," "Morse," and "Gustave Zédé" types.—*Times.*

GERMANY.—The following are the principal promotions and appointments which have been made: Vice-Admirals—H.R.H. Prince Henry of Prussia and von Blanc to be Admirals; Geissler to command of Cruiser Squadron. Rear-Admirals—Sach, Aschenborn, and Geissler to be Vice-Admirals. Fritze to be Inspector of Torpedo Department; Stubenrauch to be Commissioner of the Kaiser-Wilhelm Canal; von Prittwitz und Gaffron to be Second-in-Command of First Squadron; Fischel to be Director of Kiel Dockyard; von Ahlefeld to be Second-in-Command of the Cruiser Squadron. Kapitäns zur See—Galster, Hofmeier, von Ahlefeld, and Graf von Baudissin to be Rear-Admirals; Stiege to "Vineta" and to be Commodore in command of the American Division; Gülich to "Kaiser Wilhelm II."; Breusing to be Chief of Staff of Manœuvre Fleet; Koellner to "Kaiser Barbarossa"; von Holtzendorff to be Superintendent of Danzig Dockyard; von Basse to "Kaiser Wilhelm der Grosse"; Friedrich to "Fürst Bismarck"; Wallmann to "Kurfürst Friedrich Wilhelm"; Kalau von Hofe to "Brandenburg."

Admiral Prince Henry of Prussia, in command of the First Squadron, has re-hoisted his flag in his old flag-ship the "Kaiser Friedrich III." Rear-Admiral von Prittwitz und Gaffron has hoisted his flag as second-in-command of the First Squadron on board the "Kaiser Wilhelm II." Vice-Admiral Geissler has been appointed to the command of the Cruiser Squadron in China in place of Vice-Admiral Bendemann. As a rear-admiral, Vice-Admiral Geissler was in command of the Second Division of the First Squadron, which was sent to China last year and returned from the East in August last.

According to the official Navy List, published in the middle of October, there are on the active list: 3 admirals, 6 vice-admirals, 16 rear-admirals, 52 captains, 107 commanders, 206 captain-lieutenants, 526 lieutenants, 548 sub-lieutenants and midshipmen; 91 officers of Marine Infantry, and 170 naval engineers.

The First Squadron, under the command of Prince Henry of Prussia, has been making its first winter cruise. It at present consists of the following ships:—

First Division.

First-class battle-ships—"Kaiser Friedrich III" (flag-ship of Commander-in-Chief), "Kaiser Wilhelm II.," "Kaiser Wilhelm der Grosse," "Kaiser Barbarossa."

Despatch-vessel—"Hela."

Second Division.

First-class battle-ships—"Kurfürst Friedrich Wilhelm" (flag-ship of Rear-Admiral von Prittwitz und Gaffron), "Brandenburg," "Weissenburg."

First-class cruiser—"Victoria Luise."

Third-class cruiser—"Gazelle."

The squadron left Kiel on the 3rd inst. and after tactical exercises was to visit Christiana, returning to Kiel about the 15th inst.

Disposition of other Squadrons.—The Cruiser Squadron, at present in China, is now composed as follows:—

First-class armoured cruiser—"Fürst Bismarck" (flying the flag of Vice-Admiral Bendemann, commanding squadron).

Second-class cruisers—"Hertha" (flying flag of Rear-Admiral Kirchhoff, second-in-command), "Hansa," "Kaiserin Augusta."

First-class gun-boats, permanently attached to China station—"Iltis," "Jaguar," "Tiger," "Luchs."

First-class torpedo-boats—S 90, S 91, S 92.

On the American Station :—

Second-class cruiser—"Vineta."

Third-class cruiser—"Geier."

On the Australian Station :—

Third-class cruisers—"Cormoran," "Seeadler."

Surveying-vessel—"Möwe."

East African Station :—

Third-class cruisers—"Schwalbe," "Bussard."

West African Station :—

First-class gun-boat—"Habicht."

Special service ship—"Wolf."

Mediterranean :—

Special service ship—"Loreley."

Training and School Ships :—

The seagoing training frigates—"Charlotte," "Stosch," "Moltke," "Stein."

Seagoing gunnery school-ships—"Mars," "Carola," "Olga," "Brummer," "Ulan," "Hay," "Rhein."

Seagoing torpedo-school ships—"Nymphe" and "Niobe" (temporarily so employed), "Blücher," and 23 torpedo-boats.

Stationary training ship—"Friedrich Karl."

Submarine mining ship—"Pelikan."

The Second and Third Torpedo-boat Divisions, which are composed entirely of the new sea-going torpedo-boats recently built, have been cruising in the Baltic and North Sea in company. The Third Division is made up of Nos. 96, 98, 99, 100, 101; and the Second Division of Nos. 93, 94, 102, 103, and 104. In reality these boats are efficient torpedo-boat destroyers, as they have a speed of from 27 to 28 knots, a displacement of 350 tons, carry three 3-pounders, and the German naval authorities claim for them that they are stronger vessels and better sea-boats than the English destroyers. It is intended to build a new division of these boats each year for the present, until the German Navy is fully equipped with a powerful destroyer flotilla.

There will further remain in commission during the winter months in home waters :—

At Kiel.—The "Hohenzollern," the despatch-vessel "Sleipner," and the coast-defence battle-ships "Hagen" and "Odin."

At Wilhelmshaven.—The third-class battle-ships "Baden" and "Württemberg," third-class cruiser "Zieten."

General.—The third-class battle-ship "Sachsen" has been paid off at Kiel, and her crew transferred to the first-class battle-ship "Kaiser Wilhelm der Grosse," whose present officers and men will commission the first-class battle-ship "Kaiser Friedrich II.," which has been under repair at Wilhelmshaven, since she ran on the Adlergrund last April. The first-class battle-ship "Wörth" has been detached from the First Squadron and is to undergo a thorough overhaul and repair, including new boilers, at Wilhelmshaven, her place in the squadron being taken by the new first-class battle-ship "Kaiser Karl der Grosse," as soon as that ship is ready, but owing to the delay in her completion the "Sachsen" has again been temporarily commissioned.

An addition is to be made to the gunnery school-ships, the "Marie," one of the older small cruisers and a sister ship to the "Carola" and "Olga," already affected for gunnery purposes, is to be fitted out for a similar duty next year, a vote for the expense

being taken in the Estimates for 1902. The corvettes "Nixe" and "Sophie" are to be brought forward for service as cadet and boys' training-ships respectively, the "Nixe" taking the place of the "Gneisenau," which was lost last December off Malaga.

The new armoured first-class cruiser "Prinz Heinrich," building at Kiel is so far advanced, that it is hoped she will be ready for her trials in the spring; a somewhat similar ship the "Prinz Adalbert" is also being pushed forward, the work on her armoured turrets being almost completed. The work of lengthening the coast-defence battle-ship "Heimdall," at Kiel, is almost completed, while her two sister ships, the "Beowulf" and "Hildebrand," which are also being lengthened in the Imperial dockyard at Danzig, will be ready for leaving the slips in the middle of December. All three ships, together with their sister ship the "Hagen" are on the 1st April next year to form the Second Division of the First Squadron, in place of the ships of the "Brandenburg" class, which are all to pay off and undergo thorough repair.

Steam Trials.—The new first-class battle-ship "Kaiser Karl der Grosse," which has been built at the yard of Blohm and Voss, at Hamburg, has commenced her trials. She is the last of the four ships of the "Kaiser" class to be completed. She was laid down in 1898, launched on the 18th October, 1899, and is to be completed by the spring of next year.

The new first-class battle-ship "Kaiser Barbarossa" has completed her trials successfully. Like all the later German battle-ships, she has three screws, steam being provided by 6 cylindrical boilers placed abaft the engines, which have a total grate surface of 153 square feet, and a heating surface of 5,070 square feet, and by 6 Thornycroft water-tube boilers forward of the engine-room, which have a grate surface of 124 square feet and a heating surface of 7,224 square feet, all worked at a pressure of 13·5 kilogrammes (29 lbs.). The result of the trials was as follows:—During the 50 hours under natural draught the engines developed 7,360-I.H.P., making 94 revolutions, and giving a speed of 15·5 knots; pressure of steam, 13·5 kilogrammes (29 lbs.), and consumption of coal per H.P. per hour, 834 grammes (30 ozs.). At the 6-hour full-speed forced-draught trial, the engines developed 13,940-I.H.P., making 112·8 revolutions, and giving a speed of 18 knots; the pressure of steam being the same as at previous trial, and coal consumption not being recorded; the air pressure for the water-tube boilers being 52 millimetres (1·7 inches), and for the cylindrical boilers 12 millimetres (·47 inch).

The new third-class cruiser "Ariadne" has also completed her forced-draught trial successfully, the results being as follows:—Draught, forward 13 feet, aft 16 feet 3 inches; I.H.P., 8,827; revolutions, 168; speed, 22·18 knots; consumption of coal per H.P. per hour, 944 grammes (33 ozs.); air pressure, 43 millimetres (1·69 inches).

Another third-class cruiser of the same class, the "Thetis," has also completed her trials very satisfactorily; in the earlier vessels of the class the engines developed 6,400-I.H.P., giving a speed of 19 knots, but the engines of the "Thetis," on her six hours' forced-draught trial, developed 8,888-I.H.P., making 173 revolutions, and giving a speed of 21·7 knots; a sister ship, the "Amazone," has also been commissioned and is to commence her trials immediately.

Launch.—The new first-class battle-ship, "Schwaben," which was launched at Wilhelmshaven on 19th August, is a sister ship to the "Wittelsbach," "Wettin," "and "Zähringen." The King and Queen of Württemberg were present at the launch, Her Majesty performing the baptismal ceremony, while the King delivered the preliminary address. Her dimensions are as follows:—Length, 416 feet; beam, 68 feet; draught, 25 feet; displacement, 11,800 tons (against the 10,900 of the "Kaiser" class); 15,000-H.P.; speed, 19 knots (against 18 knots of the "Kaiser" class). Her guns are four 9·5-inch, eighteen 5·9-inch, twelve 3·46-inch, twelve 1·45-inch, and twelve large and eight small machine guns. She will carry also six torpedo-tubes. Her armour belt will be 8·8 inches thick, tapering to 4 inches fore and aft, and will run right round the ship in place of four-fifths of the length, as in the "Kaiser" class. She will also differ from the "Kaiser" type in having armour 5½ inches thick above the armour belt. Her armour deck will be from 1·5 inches to 3·9 inches thick. The steel to be built into the ship will weigh about 5,400 tons, and that of the armour nearly 2,800 tons.—*Etat für die Verwaltung der Kaiserlichen Marine, 1901*, and *Neue Preussische Kreuz-Zeitung*.

The Naval Manœuvres, 1901.—Except for German officers themselves, the Naval Manœuvres this year have presented no points of special interest, and the details which have appeared in the German press have been of so meagre a description, that we are only able to give but a very general idea of the operations.

The manœuvre fleet as finally constituted was made up of the First and Second Squadrons, the First and Second Scouting Divisions, and the First and Second Torpedo-boat Flotillas. The fleet was under the supreme command of Admiral von Koester, the Commander-in-Chief at Kiel and General-Inspector of the Navy, who hoisted his flag on board the first-class battle-ship "Kaiser Wilhelm II.," temporarily detached from the First Division of the First Squadron, with torpedo-boat No. 40 as tender, and the despatch-vessel "Grille" as repeating-ship. The composition of the different squadrons was as follows:—

First Squadron.—First Division.

First-class battle-ships—"Kaiser Wilhelm der Grosse" (flag-ship of Vice-Admiral H.R.H. Prince Henry of Prussia, commanding squadron, to which Prince Henry had shifted his flag while the "Kaiser Friedrich III." was under repair), "Kaiser Barbarossa."

Second Division.

First-class battle-ships—"Kurfürst Friedrich Wilhelm" (flag-ship of Rear-Admiral Fischel, second-in-command of squadron), "Brandenburg," "Weissenburg," "Wörth."

Second Squadron.

Third-class battle-ships—"Baden" (flag-ship of Vice-Admiral von Arnim, commanding squadron), "Württemberg," "Sachsen."

Fourth-class battle-ships—"Ægir," "Hagen," "Odin," "Siegfried."

Scouting Division.—First Group.

Second-class cruiser—"Victoria Luise."

Third-class cruisers—"Hela," "Wacht."

Second Group.

Third-class cruisers—"Nymphe," "Gazelle," "Niobe."

The First Torpedo-Boat Flotilla.

Division Boat—S 101, carrying senior officer's pennant.

First Division:—

Division boat—S 94.

Torpedo-boats—Nos. 93, 94, 95.

Second Division:—

Division-boat—S 96.

Torpedo-boats—98, 99, 100.

Second Torpedo-boat Flotilla:—

Division-boat—D 9, carrying senior officer's pennant.

First Division:—

Division-boat—D 9.

Torpedo-boats—Nos. 75, 76, 77, 79, 80, 81.

Second Division:—

Division-boat—D 10.

Torpedo-boats—82, 83, 84, 85, 86, 87.

The fleet nominally assembled on 12th August, and on the morning of that day Admiral von Koester assumed the command, temporarily hoisting his flag on board the despatch-vessel "Grille" at Wilhelmshaven, where he welcomed the returning Second Division of the First Squadron, which arrived that morning from China; the division, consisting of the four first-class battle-ships "Kurfürst Friedrich Wilhelm," "Brandenburg," "Wörth," and "Weissenburg," with the cruiser "Hela," was under the command

of Rear-Admiral Geissler, who was flying his flag in the "Kurfürst Friedrich Wilhelm"; later in the day the ships proceeded to Kiel, to refit and prepare for the manœuvres, steaming through the Kaiser Wilhelm Canal. Rear-Admiral Geissler struck his flag on board the "Kurfürst Friedrich Wilhelm," and the flag of Rear-Admiral Fischel, the second-in-command of the First Squadron, was transferred to her from the "Baden," on board which ship, in his turn, Vice-Admiral von Arnim hoisted his flag in command of the Second Squadron, temporarily formed for the manœuvres, his second-in-command, Rear-Admiral O. von Schuchmann, hoisting his on board the "Ægir." Between 14th and 20th August the Second Squadron, with the Second Torpedo-boat Flotilla, was kept at tactical and other exercises, cruising off Heligoland. On 22nd August the whole fleet was assembled at Kiel, and the Commander-in-Chief transferred his flag from the "Grille" to the "Kaiser Wilhelm II." On the following day the fleet coaled, the best record being made by the "Kaiser Wilhelm II.," which took in 702 tons, averaging 270 tons an hour, a performance on which her officers plumed themselves, as during the recent French manœuvres the best coaling record was that made by the "Saint Louis," which, however, took three hours to complete with 500 tons.

On the morning of the 24th there was a grand parade of the landing companies of the fleet, with their machine guns drawn by horses, the whole force being under the command of Vice-Admiral Prince Henry of Prussia. A close inspection was made by Admiral von Koester, past whom the bluejackets afterwards marched in different formations.

On Monday, the 26th, the combined fleet put to sea, returning to Kiel on the 31st, the week having been spent in tactical exercises under the immediate superintendence of the Commander-in-Chief. On the night of 28th-29th an attack was made by both torpedo-boat flotillas on the fleet; as the attack was expected, and the ships were on the look-out, with a bright moon and some sea on, the attack was naturally a failure, and it cannot be said that any valuable lessons resulted. Among other tactical exercises carried out a sham-fight took place between the A Fleet, represented by the First and Second Squadrons, under the command of Prince Henry, and B Fleet, which consisted of the "Sachsen," "Hela," "Jagd," and "Pelikan," which were supposed to represent an enemy's fleet of 16 ships, each vessel passing for a division 4 ships strong. As the two fleets approached in single column in line ahead, fire was opened at 5,000 yards, and Admiral von Koester, in the "Kaiser Wilhelm II.," acted as umpire. In the German Navy 16 battle-ships compose a fleet, 8 a squadron, and 4 a division.

On the morning of 2nd September the fleet left for the Eastern Baltic, anchoring off Arkrona on the night of the 3rd-4th, when another attack on the fleet was made by the torpedo-boat flotillas. Among other evolutions practised during the day was that of taking in tow and towing, the "Kaiser Wilhelm der Grosse" towing the "Baden," the "Kaiser Barbarossa" the "Württemberg," the "Victoria Luise" the "Sachsen," and the four ships of the "Brandenburg" class the four coast-defence ships of the "Ægir" class. Experiments were also carried out with carrier pigeons. The birds were carefully looked after, and fed twice a day, the allowance of food for the two meals being 30 grammes. If when released a bird did not fly off, no attempt was made to force it; and it was found that a little after sunrise was the best time for starting them, so as to ensure their reaching the main-land or their homes by sundown; under those circumstances they could be depended upon to carry their despatches safely, so long as nothing untoward happened.

On the forenoon of the 4th, while the fleet was exercising at steam tactics, a collision occurred between the "Sachsen" and the "Wacht," which resulted in the sinking of the latter, fortunately without loss of life. At the time of the accident the two squadrons had been changing lines, steaming through each other, and the ships were turning to reform column in line ahead; the "Wacht," which was repeating-ship for the Second Squadron, with the view of more rapidly taking up her new position on the outer beam of the fleet, attempted to pass between the "Württemberg" and "Sachsen," miscalculating her distance from the latter;

but although the "Sachsen's" engines were immediately reversed full-speed astern, her ram struck the "Wacht" amidships, tearing a great gap in her side, through which her engine-room was visible. After the vessels cleared, as the "Wacht" was apparently only sinking slowly, the "Weissenburg" made an attempt to tow her into shoal water, but her bulkheads giving way, she quickly filled and went down in deep water. She is the twelfth ship of the old Prussian and new German Navy which has foundered. Six of them have sunk in home waters—the training corvette "Amazone" in the North Sea; the battle-ship "Grosser Kurfürst" by collision with the "Kron Prinz" off Dover; the training-brig "Undine" off the Norwegian coast; the torpedo-boats S 41 and S 46, and now the "Wacht." Abroad the schooner "Frauenlob" was lost in a typhoon off Japan; the cruiser "Augusta" in a hurricane in the Indian Ocean; the gun-boats "Adler" and "Eber" in the great hurricane at Samoa; the gun-boat "Iltis" off Shantung in North China; and the training-frigate "Gneisenau" off Malaga. On the evening of Saturday, the 7th, the fleet anchored in Neufahrwasser Roads, where the ships coaled.

On Monday, the 9th, the fleet weighed and crossed the Gulf to Pillau, where the ships anchored in two lines according to squadrons, the small vessels being astern of the battle-ships, Admiral von Koester's flag-ship "Kaiser Wilhelm II." taking station ahead of the Second Squadron. At 3.30 p.m. the "Hohenzollern," flying the Imperial standard, was sighted entering the bay; the usual salutes were fired, and the yacht, with the Kaiser standing alone on the upper bridge, then steamed along the lines of ships, after which, turning to seawards, she made the signal for the fleet to weigh, and with the "Hohenzollern" leading, course was shaped for Hela, off which the fleet anchored a few hours later. Next morning, at 9.30, the Kaiser went on board the "Kaiser Wilhelm II.," his flag as High Admiral being transferred to that ship, while Admiral von Koester's flag was shifted temporarily to the "Kaiser Barbarossa." The signal was then made to weigh, and the whole fleet, in columns of divisions in line ahead, steamed out to the mouth of Edinger Bay, where, under the immediate direction of the Kaiser, steam tactics were carried out, in preparation for the forthcoming review by the Tsar. Early in the afternoon the fleet again anchored off Hela; and the annual pulling fleet regatta took place under very favourable circumstances, as the water was smooth and the weather lovely. The Kaiser presents a handsome silver cup as the prize for the cutter-race, which has to be won three years in succession before it becomes the property of the winning ship. Two years the race was won by a boat belonging to the first-class battle-ship "Brandenburg"; but as she was in China last year, the race did not come off, and this year fortune deserted her. The course was about 3,000 yards, and the boats started in five sections:—1. Eight 14-oared cutters from the ships of the "Kaiser" class. 2. Eight 12-oared cutters from the ships of the "Brandenburg" class. 3. Nine 10-oared cutters from the ships of the "Siegfried" class, with one from the "Hohenzollern." 4. Eight 10-oared cutters from the small cruisers. The 10-oared boats received a time allowance of 32 seconds from the 12-oared, and of 88 seconds from the 14-oared, while the 12-oared boats received from the 14-oared an allowance of 56 seconds. The absolutely fastest boat was the second cutter of the "Kaiser Wilhelm II.," her first cutter coming next, the time being 13 minutes 30 seconds; but one of the 10-oared cutters of the small cruiser "Nymphe" actually carried off the cup, winning on her time allowance, the time of the race being 14 minutes 35 seconds. After the regatta the Kaiser returned to the "Hohenzollern."

The next morning, 11th September, a telegram was received announcing that the arrival of the Russian Imperial yacht would be delayed from the forenoon to the afternoon, as she had broken one of her eccentric rods. Nevertheless the Kaiser put to sea at 9 a.m. on board the "Hohenzollern," accompanied by the "Niobe"; the First Torpedo-boat Flotilla, and the two division boats of the Second Flotilla, to meet the Tsar. About 2 p.m. the Imperial flotilla hove in sight, the "Niobe" and First Torpedo-boat Flotilla leading, followed by the "Hohenzollern," on board of which the Tsar had betaken himself, when the Imperial yachts met at sea; then came the

Russian cruiser "Svetlana," the Imperial yacht "Standart," the new Russian first-class cruiser "Varyag" closing the procession. The ships dressed and saluted as the flotilla entered the bay, and then the "Hohenzollern" steamed slowly past the anchored ships, after which she, with the Russian ships, anchored in their turn. The Tsar and Kaiser later in the day visited the "Kurfürst Friedrich Wilhelm," "Victoria Luise," "Kaiser Wilhelm der Grosse," and "Kaiser Wilhelm II." In the evening the ships were illuminated, and about 11 p.m., in preparation for the manœuvres next day, the ships forming the West, or Blue, Fleet put to sea and stood to the eastward.

The Blue Squadron was under the command of Prince Henry of Prussia and was in two divisions, of which one, the Danzig division consisted of the coast-defence vessels "Ægir," "Hagen," and "Odin," the third-class cruiser "Pelikan" and D Torpedo-boat Division; while the West Division was composed of the battle-ships "Kaiser Wilhelm der Grosse," "Kaiser Barbarossa," "Sachsen," "Württemberg," the third-class cruisers "Niobe" and "Nymphe," with the First Torpedo-boat Flotilla.

The Red Squadron, under the command of Vice-Admiral von Arnim, consisted of the battle-ships "Baden," "Kurfürst Friedrich Wilhelm," "Brandenburg," "Weissenburg," and the cruisers "Victoria Luise," "Hela," and "Gazelle" with the C Torpedo-Boat Division. In order to be able to distinguish the ships of the two opposing fleets, they flew a red or a blue flag, as the case might be, under their colours, while the red torpedo-boats had their funnels painted that colour. The speed of the ships was not in any way limited; all the coast look-out stations were manned and the fortifications fully garrisoned.

Early in the morning of the 12th the ships composing the Red Fleet also weighed and put to sea. At 9 a.m. the Kaiser and Tsar embarked on board Admiral von Koester's flag-ship, the "Kaiser Wilhelm II.," and the standards of the two Emperors were hoisted side by side at the main. The first shot of the manœuvres was fired about 10 a.m. In consequence of the short time available, the great strategical manœuvres were given up, and in place tactical manœuvres under conditions which might well occur in war were carried out.

The general idea was as follows:—The Red Squadron was cruising in the Bay of Danzig to support an army corps moving east of the Weichsel towards the west, and at the same time to blockade Neufahrwasser, where the enemy's forces were lying.

At 8 on the morning of the 12th September at the commencement of hostilities the Red Fleet were on the latitude of Rixhoeft, with the light vessels on the Hela-Pillau line; the Blue Fleet at the same time were on the longitude 15° 30′ E., with the light vessels advanced to Rixhoeft. The Blue commander had to effect the junction of his two divisions, and to effect this the West Division steamed as rapidly as possible towards Rixhoeft, with his scouts attempting to get in touch with the enemy. The Red commander, on the other hand, had to destroy the Blue ships in Neufahrwasser, before the junction could be effected, and then to attack the division coming from the west. About 10 a.m. the Red Fleet opened fire upon the Danzig division, which was anchored close under the land to the west of Neufahrwasser, supported by the coast batteries, and about midday the chief umpire decided that of the Red Fleet, the "Baden" should be considered out of action, and that the "Wörth" could only use half her engine power; and that the attack must be considered to have failed, owing to the help afforded to the Blue side by the coast batteries; on the Blue side the "Hagen" and "Odin" were put out of action. Admiral von Arnim shifted his flag to the "Wörth" from the "Baden," and ordered the latter ship to be taken in tow by the "Weissenburg," which was smartly done, the operation being covered by the fire of the other ships; the admiral withdrew his fleet then towards Hela, in order to attack the other Blue Division, which came in sight about 2 p.m. About 3 p.m. the Red Fleet opened fire, the two squadrons passing each other about 1,000 yards apart, and shortly after the action was brought to an end, the Kaiser signalling his satisfaction with the handling of the ships. The whole fleet then formed in two columns in line ahead and returned to the anchorage off Hela.

The next day the two fleets again weighed, and another battle was fought, but it was not announced which side the umpires considered had won, though both the

Kaiser and Tsar signalled their satisfaction. On the 17th the bluejackets and field guns from the fleet were landed under the command of Prince Henry, and during the next two days took part with the troops of the 41st Division in the operations carried on before the Kaiser, returning to their ships on the 20th, after the Kaiser had expressed himself much pleased with the way the men had marched and carried out their fighting duties on land. This brought the manœuvres to an end.—*Résumé* from *Neue Preussische Kreuz-Zeitung*.

UNITED STATES.—*Bureau of Equipment.*—The Naval Bureau of Equipment did a business during the fiscal year ending 30th June, 1901, according to the Chief of the Bureau, Rear-Admiral Royal B. Bradford, amounting to $5,683,820·52. Among the principal items of the expenditures were the following: Equipment of vessels, $3,950,000; depôts for coal, $700,000; increase of the Navy, equipment, $400,000; ocean and lake surveys, $100,000; coal barges, $150,000; water boat, $25,000; equipment plant, Philippine Islands, $50,000.

The report opens with a summary of the work performed under the Bureau at the various Navy Yards and Naval Stations with its cost.

The rope walk and new power house installed at the Boston Navy Yard in 1899 have given entire satisfaction. The output has been greater than during the preceding year, and the cost for labour has been further reduced. During a test of two weeks when manila yarn of the same size was being spun, the actual cost was $0·157 per lb. The cost of manila yarns for the year, all sizes, was $0·0296 per lb. These costs include the labour of everyone at work in connection with the manufacture of the rope, in the power plant and elsewhere, except the superintendent, who is borne on the civil list. During the latter part of the fiscal year naphtha gas was adopted as a fuel in the forge shop. It had never been, so far as could be learned, employed for heavy forgings. After many experiments as to the best manner of building scrap, bar, and billet furnaces, and blacksmith forges, this gas was successfully used as fuel. The cost of the work of the forge shop, however, is not decreased, the increased output being balanced by the increased cost of the fuel. The quality of the iron, however, is improved. In the billet work of the mill the output is approximately double, with but comparatively little increase in fuel.

At the New York Navy Yard, 57 ships were fitted out in whole or in part, or had repair work done in this loft.

The expense was $64,727·31. In seeking some treatment of canvas, to avoid damage to awnings by mildew, the Bureau made a set of awnings for the "Buffalo," of which half were made of canvas treated by a patent water and mildew process. After being in use less than seven months, the treated awnings had to be replaced because of rot. The untreated awnings were still serviceable. Owing to the rapid destruction of coal bags made of flax canvas, the Bureau has produced a quantity of heavy twilled hemp sacking for trial in lieu of canvas. The sacking is strong, and it is believed that it may prove easier to preserve than bags of a double thickness of No. 1 flax canvas, besides being much cheaper.

The facilities for equipment work at the League Island Navy Yard have been, and still continue to be, poor. Extensive improvements are in progress, which should materially improve the situation, but progress in construction is slow, with one or two exceptions. An extension to the equipment storehouse, the construction of an electric workshop and storehouse, a fireproof shed for painting and storing canvas, and an anchor-and-chain shed were authorised by act of Congress approved 7th June, 1900. An appropriation by the act approved 3rd March, 1901, provided for the completion of the electric workshop and the storehouse. None of this work has yet been completed and the progress is slow on all but the new electric workshop and storehouse.

No facilities for equipment or other work exist at the present naval station in Honolulu. As a coal depôt it has been of the greatest value since the time of the late war. There is storage accommodation for 20,000 tons of coal, with only moderate handling facilities. Two excellent slips have been fully completed during the present year, and have, during construction and since completion, been of much service

both to naval vessels, army transports and merchant-ships. Steps have been taken to acquire about 800 acres of land adjoining Pearl Harbour for a naval station.

Captain John F. Merry, U.S.N., Captain John Biddle, U.S.A., and Lieutenant Albert Beecher, U.S.N., a Commission sent under act of Congress to Guam for the purpose of making a survey and estimates for a harbour, report a comprehensive scheme involving plans and estimates for a secure harbour, the location and development of a naval station, coal depôt, waterworks, fortifications, and other harbour defences, and laying out a town site; all of which, if carried out promptly, as they should be, will result in great benefits to the United States in the development of this very important naval station as a strategic point and stronghold on the route to the Philippines, a coaling point and harbour of refuge to merchant-vessels, and in benefits of relatively equal importance to the inhabitants of the island.

324,108 tons of coal costing $2,273,171·81 were purchased during the year at an average cost of $7·01 per ton. 242,000 tons purchased in the United States cost with transportation $6·30 per ton. And the 105,066 purchased by ships mostly abroad, averaged $8·50 per ton. Nearly 50 per cent. more coal was used than during the preceding year. The total amount purchased was four times as great as in 1892. Continuing its policy of the past three years, the Bureau has transported American coal from the Atlantic coast to distant parts of the world for the use of United States ships of war wherever suitable storage for the same can be obtained. There are nine Navy colliers in commission with merchant crews, four employed in the Philippines and at Guam. Two 10,000-ton steam colliers are asked for, with secondary batteries and a Navy *personnel*. Adopting the views of Rear-Admiral Pluddemann, German Navy, the Department holds that squadrons should be accompanied by colliers having the same speed as the squadrons. Admiral Pluddemann says:—"The ships should not be compelled to rely on rendezvous or the uncertainty of colliers sent after them. But not only should care be taken to have a sufficient supply of coal, but also to provide appliances for taking coal on board under all circumstances in the shortest possible time. The lack of such appliances has contributed not a little to the disasters of the Spanish. The coaling of Admiral Camara's ships at Port Said was nothing but a comedy. Admiral Cervera intended to coal rapidly at Santiago and proceed; but the appliances for that purpose proved so defective that the United States fleet had shut him up in the harbour before he could finish coaling.

Tables are given showing the results of the tests of coal from little known mines in the Orient. They indicate that the grades of coal mined in the East are not well adapted for naval purposes. Arrangements have been made with firms in 53 ports to supply coal to the Navy, and the supply of coal barges has been increased. The recent order of the Department making the coaling of ships an evolution has given a great impulse to rapid coaling and brought about a feeling of keen rivalry between ships in regard to their coaling records. The Bureau has under construction for trial some flat barges, having a house with very large sliding doors at the sides and ends, also large sliding hatches on top, which will, it is thought, enable the barges to be kept loaded with the coal protected from the weather, and when opened up will not seriously interfere with the rapid discharge. This type of barge can be placed alongside a ship immediately after her arrival in port, loaded and ready for immediate use. The Bureau also has for use at different naval stations eight water barges and seven ash lighters. It is found that the use of these barges and lighters decreases the cost of supplying fresh water to and removing ashes from ships to a considerable extent. The Bureau has pursued as energetically as possible, considering the limitations of its appropriations its policy of establishing naval coal depôts at various points scattered over the world, and now has one at Hawaii, H.I., and will soon have another at Pearl Harbour; there are depôts at Tutuila, Samoa, at Guam, at Cavite, Cebu, and other points in the Philippines, at Yokohama, Japan, at Pichilinque, Mexico, and at San Juan, P.R. It is much to be regretted that little progress has been made in securing sites for other coal depôts in the West Indies. It is particularly essential that some of the deep-water ports at Cuba should be made available for this purpose. The entire waters surrounding Cuba are most important in a strategic sense, and supplies of coal should be near at

hand. Efforts are being made to establish other naval coal depôts at important localities which it is deemed unwise to discuss in a report of a public character. Work is in progress to improve the coaling facilities at Frenchmen's Bay, Me.; Portsmouth, N.H.; Bostan, Mass.; Narragansett Bay, R.I.; New York, League Island, Pa.; Washington, D.C., Dry Tortugas, Fla.; Sitka, Alaska; Puget Sound, Wash; Mare Island, Cal.; and San Diego. Cal.; and further improvements are recommended elsewhere. Of Narrangansett Bay, R.I., the report says:—"The wide expanse of good anchorage afforded by the neighbouring waters, its excellent protection in bad weather, the ease with which it can be approached from sea, and its geographical location, all unite to make this coal depôt one of the most important on the East Atlantic coast." Of San Diego, Cal., the report says:—"The geographical position of this harbour, its immediate proximity to the frontier of the United States, and the prospect in the near future of extensive harbour improvements make it exceedingly valuable as a coaling station. The harbour itself is absolutely land-locked, and at present affords at low tide a depth of about 22 feet of water on the bar. It is confidently expected that this will be increased in the near future sufficiently to permit the entrance of battle-ships. Even at present battle-ships can anchor outside, of Colorado Beach, where it is sufficiently smooth, except during a few days each year, for uninterrupted coaling from barges or colliers."

There were purchased and distilled during the year a total of 41,148,040 gallons of water for use of ships of the Navy, costing the sum of $32,264.21, a little more than one-half of that of 1899.

For pilotage, $23,511.64 was expended, and for tonnage $7,260.12.

The survey for a trans-Pacific submarine telegraph cable was fully discussed in the two last annual reports of the Bureau. No additional work has been done during the past year, nor was any necessary. The Bureau is now in possession of all *data* required, so far as surveys are concerned, to lay this cable.

Seventeen naval vessels have been engaged for the most part during the last year in making marine hydrographic surveys, and South Fox Island Shoals, Lake Michigan, has been surveyed by the U.S.S. "Michigan," under the command of Commander William Winder, U.S.N. While surveying operations in the Philippines have made good progress during the past year, it is anticipated that as hostilities cease altogether progress in the future will be much greater. Large numbers of hydrographic reports describing dangers to navigation, inaccuracies of charts, and other items of interest to the mariner have been received during the year. Such information is utilised in correcting charts and issued in the form of printed notices to mariners.

The Bureau renews its recommendation of previous years that the Pacific Ocean be carefully examined west of the meridian of the Hawaiian Islands for the purpose of definitely locating dangers to navigation, the positions of many being imperfectly known; also for the purpose of determining the existence or non-existence of a large number of dangers now shown upon the charts, which have been reported from time in years past.

The Hydrographic Office is in a very efficient condition under C. C. Todd, U.S.N., and has largely increased its output. It it recommended that Manila, P.I., and Pensacola, Fla., be added to the 17 branch hydrographic offices now in existence. The report adds:—"The Hydrographic Office of this country is justly rated as the best in the world. It is yearly visited by hydrographers from many foreign countries. Its aids to mariners are of world-wide reputation. The time has come when it is absolutely necessary to provide reasonable accommodations for hydrographic work, or progress will cease, and the high reputation now established can no longer be maintained. The increase of the Navy demands expansion in all establishments pertaining thereto. For this reason the Bureau has submitted in its estimate sufficient funds for the construction of a new and suitable building to be devoted exclusively for the use of the Hydrographic Office. Your favourable recommendation is earnestly solicited."

The school at the New York Navy Yard for the instruction of enlisted men in electricity has been continued throughout the past year with excellent results. The graduates are able to serve as tenders of dynamos in an efficient manner with no further experience.—*Army and Navy Journal.*

MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS FOR NOVEMBER, 1901.

Major-General Sir H. J. T. Hildyard, K.C.B., to be a Lieut.-General on the Staff to command the First Army Corps, and to have the temporary rank of Lieut.-General whilst so employed. Lieut.-Colonel A. Montanaro, I.S.C., to be Colonel. Surgeon-General A. F. Preston, M.B., Director-General Army Medical Service (temporarily) to be an Hon. Physician to the King. Brevet Colonel G. H. W. O'Sullivan, now Chief Staff Officer of the Force in China, from Lieut.-Colonel, R.E., is granted the substantive rank of Colonel in the Army. Lieut.-Colonel J. W. H. Potts, R.H.A., to be Colonel. Major-General Raymond Harvey, Viscount Frankfort de Montmorency, K.C.B., retired pay, Reserve of Officers, is appointed to the Honorary Colonelcy of the 4th London V.R. Lieut.-General Lord William F. E. Seymour to be Military Secretary at Head Quarters (temporarily). Major-General Sir Ian S. M. Hamilton, K.C.B., D.S.O., to be Chief of the Staff of the Army in South Africa, and to be placed on the Staff as a Lieut.-General, with the local rank of Lieut.-General whilst so employed. Colonel (temporary Major-General) W. Hill, C.B., I.S.C., to be Inspector-General of Volunteers in India. Lieut.-Colonel J. Kellie, R.E., to be Colonel. Captain and Brevet Lieut.-Colonel W. H. Manning, I.S.C., is granted the local rank of Brigadier-General whilst employed as Inspector-General of the Military Forces of the African Protectorates administered by the Foreign Office. Major-General E. L. England, C.B., retired pay, to be Colonel of the Prince Albert's (Somersetshire Light Infantry). Major-General Sir Coleridge Grove, K.C.B., retired pay, to be Colonel of the East Yorkshire Regiment. Major-General C. W. H. Douglas to be a Major-General on the Staff to command an Infantry Brigade at Aldershot. Colonel (temporary Brigadier-General) W. J. Vousden, V.C., C.B., I.S.C., is granted the temporary rank of Major-General whilst officiating as Inspector-General of Cavalry in India. Colonel J. McCleverty from h.p. to be Colonel to command the 45th Regimental District (the Sherwood Foresters, Derbyshire Regiment). Lieut.-Colonel W. G. Collingwood, Ordnance Officer Second Class, to be temporary Ordnance Officer First Class, with the temporary rank of Colonel whilst serving as Chief Ordnance Officer in Ireland. Lieut.-Colonel R. L. A. Pennington, Commandant School of Musketry, is granted the substantive rank of Colonel in the Army. Lieut.-Colonel and Brevet Colonel A. L. Woodland, C.B., is confirmed in the command of the 5th (the Northumberland Fusiliers) and the 68th (the Durham Light Infantry) Regimental Districts, and is granted the substantive rank of Colonel in the Army. Brevet Colonel F. F. F. Roupell from Lieut.-Colonel h.p. to be Colonel to

command the 31st Regimental District (the East Surrey Regiment). Colonel J. C. Dalton from an A.M.S. at Head Quarters to be a Colonel on the Staff for Royal Artillery. Lieut.-Colonel G. H. B. Coats, I.S.C., to be Colonel. Lieut.-Colonel F. M. Banister, R.F.A., to be Colonel. Lieut.-Colonel J. McDonnell, C.B., R.F.A., to be Colonel. Major-General Sir W. G. Nicholson, K.C.B., R.E., to be Lieut.-General on appointment as Director-General of Mobilisation and Military Intelligence. Colonel H. Pipon, C.B., retired pay, is granted the honorary rank of Major-General in recognition of his services in the Army.

HOME.—A new military sketching-board, the Slung Plane Table, has been invented by Lieut.-Colonel Mockler-Ferryman (Professor of Military Topography, R.M.C., Sandhurst). As it may be of interest to members of the R.U.S. Institution, a description of it is here given. It may be described as a combinatian of the Plane Table and the Cavalry sketching-board, and it is claimed for it that it approaches the former as nearly as any board not on a tripod can do; and is far more accurate in results and more comfortable to use (on foot) than the latter.

In its ordinary form the instrument consists of a plain drawing-board—1 foot square with the corners cut off—attached by a brass pivot-plate to a three-armed carrier. The carrier is suspended from the sketcher's neck by straps fastened to two of the carrier-arms, the third arm being shaped to rest against the sketcher's waist. When thus suspended, the board provides a steady level table for drawing; it can be revolved on its central pivot, so that the sketch can be "set" to the ground, and it can be clamped when "set"; moreover, the sketcher has both hands free for taking his sights and for drawing.

A trough or other compass is used on the board, or a small circular compass with index line can be attached to one of its sides; while for sighting purposes a special ruler with string attachment has been designed.

The method of sketching with the slung plane table is similar to that followed with the cavalry board, though the instrument is equally available for prismatic compass work.

Among other advantages claimed for it are :—

1. Portability, its weight being insignificant, and the whole instrument (when closed) fitting into a waterproof cover about 12½ inches square.
2. The mechanism is perfectly simple, cannot get out of repair, and will stand the roughest treatment.
3. The board itself can be detached from the carrier, and then used as a drawing-board, or attached to the service tripod for use as an ordinary plane table.
4. It can be set up ready for work in a couple of minutes.

FRANCE.—The French Minister of War has recently presented to the French Chambers his report on the recruit contingent for 1900, of which the *Armée et Marine* publishes a summary. The total number of those liable to serve of the class 1900 was 324,334, of whom 27,297 were declared physically unfit. The defects were classified as follows :—Diseases of the skin, 499; sight, 3,286; hearing, 1,117; mouth and teeth, 245; voice, 416; nose, 79; scrofulous, 590; chest, 3,163; abdomen, 3,971; genital organs, 675; limbs, 3,565; bones, 2,128; nerves, 2,578; feeble constitution, 1,172; miscellaneous, 3,813. The deduction of these 27,297 left 297,037. This last number was further reduced by 31,002 who had already been entered for the Navy; 19,523 who were classed for the Auxiliary Services; 49,488 cases which were adjourned; and 90 persons who were excluded. These reductions left a net 196,934 men for the Army, while 78,664 cases adjourned from previous years yielded a net 27,958 men, and brought

the total number of those who joined the colours up to 224,892 men. These consisted of 74,960 one-year men and 149,932 two or three years men, and they were distributed as follows :—

——	One year.	Two or three years.	Totals.
Colonial Army :—			
Infantry	—	3,464	3,464
Artillery	—	218	218
Home Army :—			
Infantry	60,175	94,870	155,045
Cavalry	—	20,600	20,600
Artillery	10,303	20,584	30,887
Engineers	1,223	4,016	5,239
Army Service	1,221	2,060	3,281
Administration and Medical ...	2,038	4,120	6,158
Totals	74,960	149,932	224,892

Of the 324,334 forming the gross total of those belonging to the class 1900 there were 14,707 quite unlettered, 4,783 who knew how to read only, 37,098 who could just read and write, 244,059 who had received an elementary education, 4,799 who held certificates, 6,469 graduates, and 12,419 whose educational *status* was unknown. With regard to employments there were 135,887 agricultural labourers, 10,362 masons and bricklayers, 16,753 carpenters and cabinet-makers, 22,821 smiths and metal workers, 7,314 shoemakers and saddlers, 8,250 workers in factories, 7,772 millers and bakers, 4,958 butchers, 7,362 coachmen and drivers, 2,918 tailors, 5,677 boat and barge men, 11,228 clerks, 655 telegraphists, 1,610 railway *employés*, 70,720 of miscellaneous employments, and 10,047 of no employment. There were 8,387 men under 5 feet in height, and 31,896 over 5 feet 8 inches. The number of volunteers for three, four, or five years' service in 1900 was 25,468—namely, 3,256 in the Navy, 3,504 in the Colonial Infantry, 1,058 in the Colonial Artillery; and in the Home Army—10,668 in the infantry, 2,271 in the cavalry, 4,118 in the artillery, and 593 in the engineers. The recruit contingent of Algeria numbered 4,860 in 1900; of these 408 were unfit, 761 were already in the Service, 3,116 joined the colours, 234 joined the Auxiliary Services, and one was excluded.

The *France Militaire* states that the number of ammunition wagons which accompany a battery of four of the new 75-millimetre (2·95-inch) guns has been increased from eleven to twelve, against the nine wagons which used to accompany the old batteries of six guns. The new gun, however, has been found too heavy for the horse artillery, its weight with carriage and limber being 37·4 cwt. It has, therefore, been decided that no ammunition shall be carried on the carriage of the gun used by the horse artillery. This will reduce the weight by nearly 4 cwt. At the same time the number of wagons accompanying each gun in this case will be reduced from three to two, it being considered that artillery operations with cavalry will be much shorter than those with infantry.

The *Patrie* announces that the 164th Regiment of the Line shortly to be formed in Corsica will bring the number of infantry regiments in the French Army up to 175—namely, 164 of the Line, 4 of Zouaves, 4 of Algerian rifles, 2 foreign regiments, and 1 of firemen. In addition, there are 30 battalions of foot chasseurs, 5 battalions of light African infantry, 2 companies of Saharian rifles, and 4 companies of military police. At the outbreak of the war in 1870 there were 116 regiments of infantry, consisting of 100 of the Line, 7 of the Guard, 4 of Zouaves, 3 of Algerian rifles, 1 foreign

regiment, and 1 of firemen ; also 21 battalions of chasseurs, 3 of light African infantry, and 7 companies of pioneers and military police. Immediately after the war 10 regiments of the Line and 9 battalions of chasseurs were added ; in 1873, 18 Line regiments ; in 1884, 16 Line regiments, 1 foreign regiment, and 1 of Algerian rifles ; in 1887, 18 Line regiments ; and since then the 163rd Regiment.

GERMANY.—According to the *Vedette* a new barracks for the special accommodation of a battalion of aeronauts is being built near the Tegel rifle range, Berlin, at a cost of £100,000. The ground on which it is being built is 550 yards long by 220 broad. The barracks proper will consist of 15 stone buildings, and in addition there will be a shed in galvanised iron for the balloons. This will be 90 feet high, and fitted with an apparatus by means of which one man will be able to open all the windows at one time by simply turning a handle. There will also be gasworks, for the gas will be compressed in a separate building, and hydrogen gas will be manufactured, ten sheds being provided in which to store the full and empty cylinders. The sheds containing the full cylinders will be at some distance from the barracks themselves, and be banked with earth. A cable for the balloons will run underground from a capstan in the barracks to the exercise ground. All the power required will be electric, and will be supplied by two large dynamos. Among other accessories will be a photographic studio, and telegraph, signalling, and pigeon stations.—*Times.*

General von Pelet-Narbonne, the well-known German military writer, has recently published an interesting study on "Cavalry on the Field of Battle" in the *Armee und Marine*, which it may be as well to reproduce almost in full :—

In military circles, everyone recognises that the importance of cavalry scouting has enormously increased in consequence of the extraordinary augmentation in the effectives of Armies. Everyone also recognises the utility of cavalry, either for the protection of, or to cut the rear communications, which are so vulnerable nowadays—such as railways and telegraphs. On the other hand, many military men consider that the *rôle* of cavalry on the battle-field is at an end, except when used against hostile cavalry, and thus merely initiate engagements which may be regarded as duels with no object. The circulation of such opinions is due to the fact that, in battles of the past century, cavalry has but rarely been able to intervene efficaciously. It is also because, since the enormous improvement in small arms, it has become exceedingly difficult for cavalry to come into such close contact with the enemy as to make it possible to attack him with the *arme blanche*. Since our last war even greater progress has taken place in armaments. It is, however, probable, that as regards the infantry rifle, improvement has reached its extreme limit, for to fire at still longer distances, and with greater initial velocity, would be useless, if not practically impossible.

The time of the battles of Hohenfriedberg, Rossbach, and Leuthen, where the cavalry broke up and scattered innumerable battalions, took hundreds of colours and guns, has passed, never to return. On the other hand, cavalry may to-day, to a greater extent than ever, direct its energies to scouting duty. At the same time, that arm should not yet altogether abandon the useful and, in certain cases, decisive *rôle* that it is still in a position to play on the battle-field. We propose to demonstrate that cavalry may easily play this *rôle* on the field of battle in the presence of the other two arms. We are of opinion that the deadly effect of small arms, which is the chief factor against the useful intervention of cavalry, is the very thing that gives rise to favourable occasions for that arm to act with effect..

As everyone knows, the losses in great battles have become, as a general rule, smaller, at first owing to the adoption of small arms, and later to their improvement. The time when the carnage was most terrible was when masses armed only with swords hurled themselves on one another. With the perfecting of small arms the high losses produced at certain points of the battle-field have had a more decisive and more sudden influence, a more disconcerting moral effect. On the other hand, the losses sustained on the whole field of battle have been relatively small. These losses that occur at certain points, during the space of a few moments only, shake the *moral* of the troops far more

than higher losses extending over the entire period of the action. A body of infantry thus shaken would fall an easy prey to cavalry. Fritz Hönig describing, after the battle of Vionville, the retreat of the brave 38th Infantry Brigade, where he himself was wounded, says :—"At such a moment it matters little whether soldiers are armed with repeating rifles, flint muskets, or with pitchforks. A bold charge of two squadrons and not a man would have escaped." It goes without saying that soldiers with no experience of war, such as they have now in all European Armies, would not go through such a crisis with the same coolness as professional soldiers who have smelt powder. If the flatness of the trajectory of the modern rifle could be increased, it could only become possible by reducing the calibre, which has now reached a limit far smaller than formerly when the French said that "the rifles do not kill." In any case, if the small projectile kills more slowly, and if the wound received by a horse during the charge is only felt after some minutes, it must be remembered that that horse continues to carry his rider towards the enemy at the rate of 700 yards a minute. The manner in which infantry break up in action also affords a favourable chance for a cavalry charge. The *schützenschwarm* (swarm of skirmishers) is the normal infantry fighting formation, whilst units in close order, forming the supports, are always at some distance from the firing line. Long lines of skirmishers, which get thinner and thinner during an action, cover the battle-field. Whilst the *moral* of the men is not shattered these lines are quite strong enough to repulse a frontal charge ; but, on the other hand, the flanks and the rear being sensibly weaker than at the epoch of column tactics, soldiers may easily lose their heads and disperse. The infantry of Imperial France was, without doubt, brave and valiant, although not so well disciplined as that of Germany : nevertheless, when at Vionville, the 1st Dragoons of the Guard delivered its charge, the men of the 13th and 43rd Regiments of the Line were so panic-stricken that they fired on one another. It is probable that the greater portion of the losses suffered by these two regiments was owing to this want of coolness. If cavalry wishes to successfully attack infantry it must form many echelons, and deliver successive charges, and, if possible, from many directions. Only a charge delivered under these conditions can succeed ; the last echelons will merely complete the work of destruction initiated by the first.

If we consider cavalry action against artillery, we must at once admit as an established fact, that even in 1870-71 the German batteries were able, thanks to their training and to the efficacy of their projectiles, to repulse, with their fire, all frontal charges discovered in sufficient time. Since that period the efficiency of guns has still further increased, and a strong line of batteries can certainly cover such a zone of ground with its fire that a frontal cavalry charge becomes practically impossible. It is otherwise if the frontal charge is favoured by the nature of the ground or carried out as a surprise, if it is combined with another flank charge, if it is directed entirely on the flanks or on the rear, or, finally, should the cavalry appear obliquely with regard to the position of the artillery. In the present day the action of infantry is prepared for by as strong an artillery fire as possible, so that the former frequently push on without sufficient support : such tactics allow the cavalry to effect a surprise. Experience has shown that bodies of men on the battle-field have all their attention absorbed by the adversary immediately to their front, with whom they are fighting, and that they observe nothing except that adversary. It is to this fact that the taking of the great battery of Tobitschan on the 15th July, 1866, was due ; the latter, which had only a weak support, was fighting the horse artillery batteries of Hartmann's division, and did not perceive, until too late, the charge of the cuirassier regiment. Every line of batteries when charged obliquely, on the flank or on its rear, finds itself in a far worse position than the other arms, because it can only execute changes of front with difficulty and with great loss of time. Further, oblique artillery fire only gives mediocre results. Cavalry may thus be regarded as the most dangerous enemy to field artillery. It is true that it would frequently be unable to carry off the captured guns, but, nevertheless, it would be able, at any rate, to produce such disorder in the batteries that the latter would find it impossible to re-open fire for some considerable time. A cavalry charge

should not only be judged according to the material results achieved by it; cavalry frequently attains its object by merely threatening a charge. A charge that has been repulsed may, all the same, be of use; our Infantry Drill Regulations practically says that cavalry may regard itself as having obtained a success over infantry "if it succeeds in stopping the advance of the latter, or obliges it to take up such a formation as destroys the proper efficacy of its fire."

Amongst the charges that were repulsed, but which, nevertheless, gave advantageous results, may be cited that of the Austrian cavalry at Königgrätz. That cavalry hurled back the Prussian squadrons on their own infantry; the Prussian cavalry obliged to cross the bridges, did so singly and in disorder, and so compelled its infantry to halt. Thanks to that charge, the retreat of the Austrian Army on the Elbe did not degenerate into a catastrophe. The 52 squadrons engaged lost 72 officers, 1,258 men, and 1,902 horses (25 per cent. of the total horse effective, which was 7,000). The same applies to the charge of Bredow's brigade, which assured victory to the Prussians. The regiments of that brigade were compelled finally to withdraw in disorder, and lost 55·7 per cent. of their effective. That charge would undoubtedly have ensured the entire rout of the enemy, if, instead of being delivered by 6, it had been delivered by 30 squadrons formed in many echelons, which could have hurled themselves successively on the French. On the same day the 1st Dragoons of the Guard, by delivering a charge, saved the remains of Wedell's brigade, which was in flight, as well as the Berendt battery of the 10th Artillery, which was unable to change position. These three squadrons lost 17 officers, 121 men, and 246 horses. These examples prove to us to what use cavalry may be put on the battle-field if properly handled. Unfortunately it was not thus in the second part of the 1870-71 campaign, in the course of which the greatest results might have been achieved by making intelligent use of the cavalry. The following are the reasons why cavalry was not more frequently employed:—

1. Our action taking from the commencement a favourable turn, our chiefs saw no necessity to engage the cavalry.
2. The chief commanders of our cavalry, with rare exceptions, did not understand how to properly handle that arm, and consequently lacked confidence in themselves.
3. During peace manœuvres false ideas had been instilled into our cavalry as regards its efficiency with the *arme blanche*. It was badly trained in this respect.

The French cavalry charges at Wörth, Beaumont, and Sedan cannot serve as a basis for our argument because they were merely desperate ventures. Duels between hostile cavalry are necessary; the cavalry of one side should always endeavour to put that of the enemy out of action. It is only after having achieved that result that it can carry out its reconnoitring unimpeded, and can concentrate all its efforts on the other arms. This cannot be properly carried out at manœuvres, for the beaten cavalry after being pursued for a short time come back on to the manœuvre ground, in order that opportunity for instruction may not be lost. It is far otherwise in action. There the beaten cavalry becomes a negligeable quantity for the whole day.

ITALY.—The Minister of War has just published his annual report, which makes up, in a measure, the complete history of the Italian Army for the past year. It is a most voluminous document, but it deserves close study, as it gives a precise sketch of what the Italian Army is. The following is a *résumé* of some of the most important details:—

1. The State of the 1879 Class.- On the 15th April, 1899, the day of the opening of the recruiting operations, there were 441,001 young men entered on the recruiting lists; of this number 315,948 were born in 1879, and the remaining 98,053 men were drawn from preceding classes. If these numbers are compared with those of the previous year, it will be seen that they exceed those of this year by 43,073 men. The verification of the recruiting lists, the disappearance of a certain number of young men and other causes, reduced the number mentioned above, viz., 441,001, and brought

it down to 398,851 men. All these young men took part in the recruiting operations of their class, and were classified as follows :—

Enlisted in the various categories	...	199,394, or 50 per cent.
Put back	...	91,647, or 22·97 per cent.
Unfit	...	78,187, or 19.60 „
Failing to appear	...	29,623, or 7·43 „

It will thus be seen that for various causes 50 per cent. of those inscribed on the rolls were either temporarily or altogether relieved from the obligation of military service. The young men passed fit for service and posted to the Army, reached, as has been shown, a total of 199,394. These young men were thus distributed :—

1st Category	...	102,422, or 51·36 per cent.
2nd „	...	16, or 0·02 „
3rd „	...	96,956, or 48·62 „

The small number of recruits allotted to the 2nd Category is consequent on its abolition. That category has, as a matter of fact, been done away with, although it still exists by regulation. The number of young men attached to the 1st Category, which constitutes the real basis of the Italian Army, scarcely amounts to 25 per cent. of the numbers on the recruiting rolls. Of the 102,422 recruits who were allotted to the 1st Category, 93,693 only presented themselves at the districts when their class was called to the colours. At the same time, if to that number were added 4,504 men of this class who were already serving with the colours, it would be found that the real contingent amounted to 98,197. That contingent was distributed as follows, as regards periods of service :—

For a period of 3 years with the colours ...		46,846, or 47·70 per cent.
„ „ 2 „ „	...	40,682, or 41·43 „
„ „ 1 year „	...	6,165, or 6·27 „
For a variable period of service with the colours		4,504, or 4·60 „

The call to the colours was made in two batches. On the 5th December, 1899, men to be attached to the mounted branches of the Service were called out. On the 26th and 29th March, 1900, all the remaining men were called out. The 93,693 men who responded to the calling out of their class were thus distributed amongst the different branches of the Service :—

Infantry—52,979 to the Line ; 1,393 to the Grenadiers ; 7,618 to the Bersaglieri, and 5,406 to the Alpine troops ; making a total of 63,396 men, or 71·73 per cent.

Cavalry	7,234	„	7·72 „
Artillery	10,880	„	11·62 „
Engineers	3,011	„	3·22 „
Artillery and Engineer Train	1,606	„	1·71 „
Medical Department	989	„	1·06 „
Commissariat	762	„	0·82 „
Royal Carabiniers	1,384	„	1·46 „
Cadet Officers and Cadet Sergeants	431	„	0·46 „

The number of men per district furnished by the 1899 Class was as follows :—

Northern Italy, 39 districts.—18,103 men allotted to the 1st Category, 46,913 to the 2nd and 3rd Categories ; total, 95,016 men.

Central Italy, 21 districts.—22,644 men allotted to the 1st Category, 21,171 to the 2nd and 3rd Categories ; total, 43,815 men.

Southern Italy, 18 districts.—19,915 men allotted to the 1st Category, 18,590 to the 2nd and 3rd Categories ; total, 38,505 men.

Insular Italy, 10 districts.—11,760 men allotted to the 1st Category, 10,293 to the 2nd and 3rd Categories ; total, 22,053 men.

Thus out of every 1,000 men enrolled in the Army, as a result of the recruiting operations, 476 belong to the Northern districts, 220 to the Central, 194 to the Southern, and 110 to the Insular.

Insufficient chest development and general weakness of constitution were the principal causes of the large number of men, 78,187, who were found unfit for service.

The largest proportion of rejections came from Insular Italy, and from Calabria. The smallest men came from the Southern and Insular provinces, whilst the tallest men were from Northern Italy, and especially from Venetia.

The largest proportion of those failing to appear, came, as usual, from the frontier and seaboard provinces: this is accounted for by the fact that these provinces furnish most of the emigrants. Of the 199,394 men allotted to the 1st Category, 67,308, or 33·76 per cent., could neither read nor write; 128,354 could both read and write; whilst 3,732 could only read. The number of illiterate individuals is 2·17 per cent. less than last year. Finally, the number of enrolments in the three categories has risen from 186,050 men in 1890 to 199,394 in 1899; this is an average annual increase of 0·53 per cent.

2. *State of the Italian Army on 30th June, 1900.*—The total effective of the Italian Army, including the various Militias, was as follows on 30th June, 1900:—Officers, 36,241; non-commissioned officers and men, 3,272,409; total 3,308,650.

On 30th June, 1899, it amounted to 35,909 officers; 2,236,161 non-commissioned officers and men; total 2,272,070.

Consequently during the financial year 1899-1900, the Italian Army increased its effectives by 36,580 men.

The Italian Army, therefore, on paper, can dispose of about 3,300,000 men; but as a matter of fact, about 2,000,000 of these belong to the Territorial Militia, and of these only about half have any military instruction whatever. On the other hand, emigration would undoubtedly deprive Italy of a large number of excellent soldiers in the event of a mobilisation. It may, therefore, be reckoned that Italy is in a position to actually mobilise about 1,800,000 men.—*Précis* from *La France Militaire.*

RUSSIA.—Every year, during the summer, Russian troops leave their barracks and go into camps of instruction for about four months. The programme of drills and manœuvres to be carried out during the summer are submitted every year, in the spring, for Imperial approval. They are drawn up by the staffs of the military districts, taking into consideration the regulations on the subject, and also the resources placed, as a whole, at their disposal by the Minister of War. During the first part of their stay in camp the various units carry out, separately, manœuvres suitable to their own branch of the Service, and prepare themselves for their tactical *rôle* on the field of battle. The different arms are then concentrated on certain points to form the general assemblies in which they are exercised to manœuvre in concert. These concentrations are for the purpose of establishing a strict community of action, and to accustom officers of higher rank to the command of detachments of all arms. The general assemblies last for four weeks, the last days of which are usually given up to march-manœuvres, during which the troops, who change camp each day, are called upon to manœuvre on ground they do not know, and thus derive the greatest amount of profit from their instruction. The duration and organisation of these march-manœuvres has, hitherto, varied in the different military districts. In the Kiev district, march-manœuvres have been greatly developed, and have, for several years, terminated by manœuvres between the several larger units. With a view to uniformity in the organisation of march-manœuvres, the Minister of War, last year, issued some general instructions on the subject.

The duration of the general assemblies (four weeks) will, as far as possible, be divided into two periods of two weeks each: during the first of these periods the troops will be exercised in camps; during the second they will carry out march-manœuvres on broken ground. During the fortnight that they will be concentrated in camps, the larger units will carry out manœuvres in mass, simple tactical exercises, inter-regimental manœuvres, and field firing manœuvres of detachments of the three arms. The march-manœuvre period will be devoted to march exercises and to sham fights, each side consisting of a detachment of the three arms, with a minimum effective of an infantry regiment with corresponding artillery and cavalry; these effectives will be gradually increased. The march-manœuvres may terminate in combined exercises between various divisions, and even between different army corps. In that case, should

the two weeks be deemed insufficient, the period may be increased by the authority of the War Minister. Field firing may also take place if the ground and the circumstances permit. March-manœuvres are generally carried out by divisions and are, at the commencement, directed by the commander of the unit under instructions from the army corps commander. Then, should the distances between divisions be sufficiently decreased, divisions may be manœuvred one against another, and may conclude with army corps manœuvres against a skeleton enemy. Neighbouring army corps may also be opposed to one another, but prolonged movements of large concentrated units should be avoided. As a general rule, an infantry division manœuvres with its artillery brigade and a cavalry regiment. As far as possible units not forming a portion of the army corps, such as mortar regiments, engineer units, etc., are obliged to participate in the march-manœuvres, and are temporarily attached to the infantry divisions. In order, however, not to interfere with the technical instruction of engineers, units of that branch of the Service are only called out for manœuvres of large detachments, and only in the proportion of one third of the total number of the sapper companies of each engineer brigade.

The programme of the march-manœuvres is drawn up by the divisional staff, after a reconnaissance of the ground, and generally consist of three days of mixed regimental manœuvres, two or three days of mixed brigade manœuvres, four or five days of division or army corps manœuvres. The schemes of the different manœuvres should all bear on the following exercises, viz. :—

a. Marches.—All measures to ensure safety : connection between front and rear ; shortening of columns, chiefly by causing artillery to march by road and infantry across country.

b. Outpost Duty.—In every form, day and night : relief of units.

c. Positions.—Choice of, occupation of, defensive organisation, attack and defence of : a complete defensive organisation, consisting of at least six hours' work, must be carried out at least once.

d. Passage of Rivers, etc.

e. Night Operations.—Marches : connection between columns : daybreak attacks ; night fighting.

Every week five days must be given to manœuvres, and two, one of which being Sunday, to repose. The average length of the marches should be about 15 kilometres (about 9¼ miles). During the halts a portion of the troops should bivouac, a portion be placed under canvas and a portion in cantonments, as may be considered the most suitable method in war. The feeding should be carried out as far as possible under the same conditions that are met with on service. Two days' rations should be carried by the troops. Should the regimental transport carrying the company camp-kettles arrive late at the halting place, it would be good practice to prepare the food in the men's mess-tins. The men should also be taught to bake, and to cook all sorts of dough to temporarily replace bread. The sick are to be left in the civil or military hospitals. Should the hospitals be too far off, a temporary infirmary is opened in a village situated in the centre of the lines of communication of the manœuvre district.

Whether carried out by two regiments, by two divisions, or even by two army corps, the march-manœuvres are all of the same character : they constitute a series of exercises quite distinct from one another : the tactical scheme varies each day ; each day, too, the commanders of the opposing forces and of the services are changed.—*Revue Militaire.*

UNITED STATES.—Second only in importance to the Secretary of War's recommendations of last year for the re-organisation of the Army, which culminated in the Act of 2nd February, 1901, are the plans of Mr. Root for this year for the organisation and instruction of a General Staff for the Regular Army. The details of the plan have been decided upon by the Secretary, and immediately upon his return to the War Department he will make the first move in the scheme by ordering the establishment at Washington Barracks of the War College. One of the large

buildings at the barracks has been selected for the headquarters of the War College, and it is the intention of the Secretary immediately upon his return to assign instructors there and to detail Line officers especially adapted for General Staff duty for instruction at the college.

The Secretary's decision to have the War College situated at Washington has met with general approval from a majority of the officers of the Army who are cognisant of Mr. Root's plans for that institution. It may be here stated, upon the best authority, that the distinct purpose of the War College is to train officers now in the Line for future assignment on the General Staff, when the latter is organised by Congressional legislation. The old battle-fields of the Civil War are to be used for purposes of instruction by the War College, and here again Washington is favourably located inasmuch as it is in close proximity to Virginia and Pennsylvania and to all of the Southern States. This facilitates the plan of selecting one of the engagements of the Civil War for working out tactical and strategical problems on the ground by the officers under instruction.

The establishment of a General Staff for the Army has been very close to Mr. Root's heart since he became Secretary of War. Last year, it will be remembered, General Ludlow was sent to Europe for the purpose of studying the staff of Germany, England, and other military Powers, in order that this country might benefit from the experiences of them all. Upon General Ludlow's return it was found that our form of Government would preclude the possibility of modelling our General Staff after that of Germany, but that it would be possible to adopt some of the ideas of England. The recommendations which will be made to Congress by the Secretary of War are that a General Staff be organised whose functions will be purely advisory. This staff will be composed of officers at first detailed from the line, selected by the Secretary of War on account of their special qualifications for duty of such a nature, and who will show, in some manner to be prescribed, their fitness for the honour of General Staff duty. As we have said, it is proposed to detail officers at first, but if their staff service warrants, they will finally be appointed permanently to the General Staff, which it is believed will be considered a great honour much sought after by all Line officers. The nucleus of the General Staff is to be formed from officers of rank selected by the Secretary and from junior officers who are graduated with honour from the War College.

Upon the formation of the General Staff, it will meet in Washington at the War Department, and it will be its duty to plan all campaigns and attacks upon any country with whom there is a possibility of war. Every possible contingency will be taken into consideration by this General Staff, and its purpose will be to keep this country in readiness for war with any Power, so that at all times we shall be in a case of preparedness, and if war is declared, shall know exactly the number of troops that will be required from each arm of the Service, the military and physical condition of the country in which we are to operate, and, in fact, all that should be known by a military Power of the other military nations of the world. The Secretary realises, probably better than anyone out of the Army or Navy, that we shall have to be prepared for war at any time, and it is his intention to avoid in the future any such conditions as faced us at the outbreak of the Spanish-American War.

The General Staff will be separate and distinct from what is now the staff of the Army, and its functions will be entirely different. It will be for it to plan, and for the staff department to carry out these plans. Such is the War Department's idea of what a General Staff should be, and such will be the recommendations that will undoubtedly be made to Congress this year.

Colonel Randolph, Chief of Artillery, has presented a memorandum to the Secretary of War providing for a general scheme for the distribution of the Coast and Field Artillery throughout the country. The establishment of several new posts is recommended and will undoubtedly be adopted. This memorandum is now in the hands of Mr. Root and will be acted upon in the immediate future. When it is approved there will be changes in the present stations of companies and batteries

of artillery. Officers of the Corps will await its promulgation with great interest. The recommendation made by Colonel Randolph that the batteries and companies of artillery be renumbered, has been approved by the Secretary of War. As we have stated, the batteries are to be numbered from 1 to 30, inclusive, and the companies from 31 to 156, inclusive. This renumbering will avoid any possible confusion in the designation of companies or batteries.

It has been decided by the War Department to have one of the thirty batteries of field artillery a mountain battery equipped with modern mountain guns of the same kind as those which have given such good satisfaction in the campaigns in the Philippines. Tentatively the 28th Battery, now being organised at Fort Leavenworth, Kas., has been selected by the Department as the mountain battery of field artillery, and orders to that effect will probably be issued within a few days. The usefulness of a mountain battery has been fully demonstrated to the War Department, and it is upon the urgent recommendation of the Chief of Artillery that it is to be organised.

Enlistments for the Artillery Corps are progressing to the satisfaction of the officials at the War Department, and it is now expected that by 20th September the sixth and last increment to the corps will have been completed and that the Secretary will authorise at that time the promotions which will occur as a result. The latest reports which have been received at the War Department, dated 6th September, show that since the fifth increment was made there have been enlisted 954 men in the artillery.

Orders have been issued to General Chaffee directing that nine companies of artillery be sent home from the Philippines to this country by the way of San Francisco at the earliest practicable date. The companies selected are the 60th, 61st, 62nd, 63rd, 64th, 65th, 68th, 70th, and 71st Companies of Coast Artillery. Lieut.-Colonel Abner H. Merrill and Major H. C. Danes are scheduled to return with the companies. It is expected that the companies will sail in December next. There is a plan at the War Department which, if it goes into effect, will mean the relief this winter of many of the Regular regiments from Philippine service and the ordering there of some of the new regiments organised under the act of 2nd February. These new regiments have been retained in this country thus far in order that they might be well organised prior to their being ordered for foreign service. The men are being trained daily and, from reports recently received at the War Department, it is evident that excellent progress has been made. The War Department realises to the fullest extent how necessary it is to give relief, as soon as possible, to those regiments which have been in the Philippines over two years. But as fully is it realised how exceedingly important it is that the troops sent to their relief be well organised and trained. There will be great need of a strong force in the Philippines for a long time.—*Army and Navy Journal.*

CORRESPONDENCE.

THE INFANTRY ATTACK SUPPORTED BY ARTILLERY.

To the Editor of the JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION.

SIR,—From the war in South Africa we have little to learn about the infantry attack that could not have been learnt before the war by the study of our own and foreign military works. For this reason there will be nothing novel in this letter for those who have taken the trouble to study the above-mentioned works. The following is written for those who have not made such studies, as a general outline on which to form deductions as to how an attack in the future will be carried out.

To begin :—

An infantry attack may either be a feint to draw off the enemy's attention from other parts of the field, or it may be pushed home, according to the tactical object in view. The first of these is practically the same as the preliminary stages of the second : therefore we will only discuss the attack, which, having been deliberately planned, aims at decisive results.

Now, in order to carry out a successful attack on a position, that is, not only taking the position, but taking it with the least loss to ourselves, at the same time inflicting the heaviest losses on the enemy, and fully attaining the tactical object required, certain preliminary points must be adhered to :—

1. All possible information regarding the position and the enemy's dispositions must be obtained. This is gained by reconnoitring patrols, single scouts and spies. Or if the information obtained by the above is not sufficient then a reconnaissance in force is necessary.
2. The weak points in the defence must be determined.
3. Points to be attacked selected.
4. Method of attack decided on.
5. Preparation of the attack by artillery and infantry fire.
6. Every advantage of ground turned to account. (If the ground is exposed in places, positions may have to be selected and occupied by night, entrenchments being dug.)
7. Impressions made on the enemy at decisive ranges by superiority of rifle at the points to be attacked.
8. Careful individual control of fire.
9. Combined and simultaneous action of the whole force, especially at the decisive moment.

Before the troops advance to the attack they are presumably 12,000 yards or more away from the enemy's position (out of range of the enemy's long-range guns). Therefore advanced troops are pushed forward. These should endeavour to secure the positions selected for the heavy artillery. Drive back the enemy's advanced troops. Secure and occupy any points that may support the attack.

Under cover of the heavy guns and (if near enough to the enemy) these advanced troops, the main body makes any further dispositions, if necessary, for the attack, and then advances, each unit against that portion of the position which has been allotted to it. Deployments should be deferred as long as possible by taking advantage of all cover offered by the topographical features of the ground. Deployments must take

place under cover from view and fire. The deployment having taken place and the field artillery having come into action, the actual advance against the position will now commence.

Owing to the facility of concealing guns through the introduction of smokeless powder, it is impossible to hold the enemy's artillery in check, therefore the infantry will have to advance under artillery fire. To do this, extensions must be increased, the firing line, supports, and reserves each divided into successive waves. The infantry as they approach the position should be able to locate some of the enemy's guns, and then, if necessary, with the help of their own artillery, they should try to subdue them.

Here the artillery have a very difficult point to decide :—

"The best distribution of their fire to help the infantry advance, *i.e.*, the extent to which they should fire at the enemy's guns and at the positions to be attacked, in order to be of the most support to their infantry."

The more effective this bombardment is, the less difficulty will the attacking infantry meet in their advance. Portions of the infantry will be left in commanding positions, if any, and on the flanks, if feasible, to help the artillery. If this cannot be done, and the enemy's artillery is impeding the advance, then portions of the firing line must be told off for this duty only (keeping down the enemy's artillery fire).

The attacking infantry's main object is to push as near as possible to decisive range without firing. When the first wave is compelled to fire, being unable to advance further, then each successive wave must come up and join the firing-line till a superiority of fire is gained and an impression made on the enemy, enabling the advance to continue. This further advance will have to be made by alternate rushes of portions of waves, under cover of the fire from the remainder. These rushes will be made from cover to cover. A deliberate attack would never be made over ground void of cover, against unshaken troops. Eventually, these rushes will become rushes of individual men, each deciding for himself when to advance, where to go, how to fire, and what to fire at. The officers should be leading, so as to show by their presence the general direction of the advance. It is impossible for them to have any personal control over more than two or three of their men.

The co-operation of the artillery during these rushes is of the utmost importance.

Points will be reached where a still greater impression is required on the enemy (the latter may have been reinforced). The advance is checked : Fresh waves must push up into the firing line, until by dint of vastly superior fire the advance is enabled to continue. (By firing line is meant the men actually firing in front at the time.) Eventually the defenders' fire will slacken, the decisive point has been reached ; if the reserves (fresh troops) are not up ready to carry out the assault, the firing line must itself advance to carry out the assault, so as to prevent the enemy retiring with impunity. This advance will have to be made, firing while advancing, if the enemy have not ceased to fire altogether, until within about 150 yards, when the charge will take place in the prescribed manner.

The artillery must lengthen their range during this final stage. By so doing they maintain their moral effect, at the same time having a better chance of their shells taking effect on the enemy as he retires, and less chance of inflicting losses on their own infantry.

In the above only that portion of the attack has been described which actually assaults the positions. It must not be inferred that the enemy has been overcome by the unaided effort of this attack : which would mean a purely frontal attack succeeding —an impossibility against unshaken, well-armed, and disciplined troops. No, the attack will either be enveloping or supported by a turning movement.

In the first, the enemy's flanks (or flank) are enveloped and threatened or attacked ; by this means enfilade fire is brought to bear on that part of the position to be attacked. This attack may be carried out in two ways : by marching forces independently against the flank and front, each to commence attacking at given times ;

or by advancing against the front and rapidly deploying to a flank. This second is the safer, as it insures to a certain extent simultaneous action.

The flank to attack will generally be that one nearest the enemy's line of retreat.

The flanks are the vulnerable points in enveloping movements, and the danger of a turning movement is being taken in detail.

Lessons to be Learnt.—Infantry must learn individually to act and think for themselves. Infantry must learn individually to exercise their own fire control.

Artillery must learn to pay strict attention to fire discipline, and to support their infantry at all costs. They must remember that the actual effect of their shells is but slight, and that their main object is to support their own infantry by the moral effect of shell fire on that portion of the position actually to be attacked, and other points that harass the advance against that portion. They must on no account fire at stray targets, however good an object they may offer, if they have no connection with the point to be attacked. They must learn the art of concealing their guns.

The following are a few instances in the African campaign from which lessons can be learnt :—

Concealment of Artillery.—When Sir George White moved out from Ladysmith to attack the Boers near Farquhar's Farm and Pepworth Hill, prior to being invested in Ladysmith, our artillery shelled a ridge about 3,000 yards range, where they supposed the Boer guns to be. As a matter of fact, their guns were on a ridge about 500 yards further back, concealed, from which they fired with impunity at our troops.

Attacking a Position without the necessary Information.—The attack on Colenso (first).

Attacks in successive Waves.—Talana Hill and Elands Laagte.

Individual Rushes.—Cingola. The Boers at Ladysmith on 6th January.

Assaulting a Position with the Bayonet.—The South Lancashires in General Buller's final advance into Ladysmith.

Purely frontal Attacks.—Colenso and Spion Kop.

The enemy was well armed and experienced, neither flanks was threatened, no turning movement attempted, and the results in both cases were as anticipated since the 1871 war.

Bergendal, near Belfast, has been misnamed a frontal attack in the newspapers ; but it is only necessary to state that General French was behind the Boer position about 10 miles away, and General Pole-Carew was occupying the whole of the enemy's west flank, which he had taken the day before.

Enveloping Movement.—The fighting at Belfast before Bergendal. The movement was done by deploying to a flank.

J. DOUGLAS WALKER,
Lieutenant, Black Watch.

NAVAL AND MILITARY CALENDAR.

NOVEMBER, 1901.

1st (F.) H.M. Yacht "Ophir," with T.R.H. the Duke and Duchess of Cornwall and York, arrived at Portsmouth.

" " Colonel Benson and his column were attacked by Botha with 1,500 Boers at Brakenlaagte, between Bethel and Bronkhorst Spruit. The fighting lasted two days, the Boers being eventually driven off after heavy losses having been sustained on both sides. British casualties amounted to Colonel Benson and 85 killed, and 216 wounded. The Boers lost 140, including Commandant Opperman killed.

2nd (Sat.) H.M.S. "Iphigenia" arrived at Portsmouth with relieved crews from the Mediterranean.

2nd (Sat.) H.M.S. "Proserpine" arrived at Plymouth from West Indies.
" " T.R.H. the Duke and Duchess of Cornwall and York returned to London from their Colonial tour.
3rd (S.) An attack was made by natives on a survey party on the Indian Frontier, many Sepoys being killed.
4th (M.) H.M. the King assumed the new title of "King of the British Dominions beyond the Seas."
5th (T.) H.M.S. "Shearwater" left for the Pacific.
" " The *London Gazette* contained Orders in Council respecting the duties of the Commander-in-Chief and also the requirements for Volunteer efficiency.
7th (Th.) H.M.S. "Pandora" commissioned at Portsmouth for Mediterranean.
" " Launch of first-class battle-ship "Benedetto Brin" at Castellamare for Italian Navy.
9th (Sat.) H.M. the King created the Duke of Cornwall and York Prince of Wales.
" " The New North-West Frontier Province of India was formerly inaugurated at Peshawar.
13th (W.) Launch of first-class cruiser "Monmouth" from the London and Glasgow Shipbuilding Yard on the Clyde.
" " Launch of torpedo-boat destroyer "Ahatsuki" from Messrs. Yarrow's Works at Poplar for Japanese Government.
" " Loss of coast-guard cruiser "Active" off Granton with 19 officers and men.
" " A Yeomanry patrol of Lord Methuen's column was surrounded by 300 Boers near Brakspruit, and lost 6 killed and 16 wounded before it was relieved.
" " A British convoy was captured by the Boers near Lambert's Bay.
16th (Sat.) The 2nd Dragoon Guards left England for S. Africa on the "Oratava."
17th (S.) H.M.S. "Resolution" commissioned at Portsmouth for coast-guard service at Holyhead.
19th (T.) 1st Bn. King's Own Royal Lancaster Regiment left England for Malta on the "Sicilia."
20th (W.) Lord Kitchener reported that Col. Colenbrander had taken 54 prisoners.
" " In an engagement near Villiers Dorp 350 British troops were captured, but were released on the appearance of Colonel Rimington's column.
22nd (F.) H.M.S. "Amphitrite" sailed for Hong-Kong, with relief crews for "Alacrity" and "Snipe."
" " A fresh Boer plot was discovered at Johannesburg; 20 arrests were made.
" " Lord Kitchener sanctioned the raising of two burgher corps.
23rd (Sat.) The offer of the Canadian Government to supply 600 more mounted men for service in S. Africa was definitely accepted by the British Government.
26th (T.) H.M.S. "Fearless" and "Rinaldo" commissioned at Sheerness for China.
27th (W.) Colonel Charles Knox captured Commandant Joubert and 36 members of his commando.
28th (Th.) H.M.S. "Vestal" and "Mutine" commissioned at Chatham and Sheerness respectively for China.
" " Commandant Fouché stated in a letter that he had shot 2 men of the Connaught Rangers taken prisoners at Dordrecht on the 16th inst.
" " 1st Bn. King's Own Royal Lancaster Regiment arrived at Malta from England on the "Sicilia."
29th (F.) 3rd Bn. Lancashire Fusiliers left Malta for the West Indies on the "Sicilia."
30th (Sat.) The 7th Hussars left England for South Africa on the "Templemore."

Addendum to October Calendar.

27th (S.) Launch of first-class gun-boat "Tejo" from the Government Yard, Lisbon, for Portuguese Navy.

FOREIGN PERIODICALS.

NAVAL.

ARGENTINE REPUBLIC.—*Boletin del Centro Naval.* Buenos Aires: October, 1901.—"The Maintaining of Energy." "Types of Armoured Vessels for Battle-ships and Cruisers" (*concluded*). "Servomotors" (*continued*). "The Question of Submarines." "National Coasting Trade." "Determination of the Absolute State of a Chronometer." "Dredging of the Puertos and Rios." "Foreign Naval Notes."

AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens.* No. 12. Pola: December, 1901.—"The Effects of the Sea on Coasts and how they may be Modified." "The English Naval Manœuvres of 1901." "Foreign Naval Notes."

BRAZIL.—*Revista Maritima Brazilieria.* Rio de Janeiro: September, 1901.—"The Submarine-boat 'Mello Marques.'" "Historical Review of the Artillery and Pyrotechnic Workshops." "The Sailing Navy." "A Contribution to the History of Naval Tactics" "A Compendium of Ballistics and Artillery." "The Mercantile Marine and the School of Pilots." "The Defence of Coasts." "The Range of Modern Guns." "The Actual English Navy." "Foreign Naval Notes."

FRANCE.—*Revue Maritime.* Paris: October, 1901.—"The Comte d'Orvilliers, Lieut.-General of the Fleet, and his Chief of the Staff, Captain the Chevalier du Pavillon, during the Operations of 1778 and 1779" (*continued*). "The Influence of Submarine Cables in Supremacy on Land and at Sea." "On the Doctrine of War." "The English Naval Manœuvres of 1901." "Malta: Its Military History and Actual Strategic Importance." "The Question of Submarines." "Naval Manœuvres at Newport, U.S.A." "Foreign Naval Notes."

November, 1901.—"The Comte d'Orvilliers, Lieut.-General of the Fleet, and his Chief of the Staff, Captain the Chevalier du Pavillon, during the Operations of 1778 and 1779" (*concluded*). "The Chronicle of Lorient" (*continued*). "The Armament of Ships of War and the Progress in Artillery *Matériel*." "An Electrical Safety Apparatus for Boilers and Steam-Tube Systems." "The Dürr Water-tube Boiler." "The Works at Gibraltar and the House of Commons." "Extracts from Divers English and American Periodicals." "Foreign Naval Notes."

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NOTICES OF BOOKS.

Der Königlich Hannoversche General Sir Julius von Hartmann, K.C.B. Eine Lebensskizze mit besonderer Berücksichtigung der von ihm nachgelassenen Erinnerungen aus den Feldzügen auf der pyrenäischen Halbinsel, 1808 bis 1815. By VON HARTMANN, General der Kavallerie und Gouverneur von Strasburg. 8vo. Berlin, 1901.

This little work, the life of a gallant and distinguished soldier, by his no less gallant and distinguished son, is interesting mainly as showing what the existence of the German Legion, the history of which has been given us exhaustively by Colonel Beamish, meant for the country it represented, and for the impressions of a foreigner in our Service as to the campaigns that preceded the Peninsular, and that war itself. The Hartmanns were an upper middle-class family in Hanover, the grandfather of the general having been a doctor of laws and *comes palatinus* of the Roman Empire. Born in 1774, "amid thunder and lightning," which were afterwards recognised as appropriate accompaniments, Julius was a novel apparition in this family of lawyers. At an early age his father decided that he was the fool of the family and as such must be a soldier, in spite of his delicate health, so he entered the Hanoverian artillery as a volunteer-cadet at the age of 13. Being asked by the disciplinarian colonel, "Smelt powder, eh?" he answered aptly, "Yes, and eaten it too." Being sent at first during the winter months to the Artillery School, he came under the instruction and influence of Scharnhorst, then a Hanoverian lieutenant. He took part in the campaign of 1793 with the 13,000 troops in our pay, being at the battle of Famars, the siege of Valenciennes, and the defence of Meinn, at which he was taken prisoner, though the main body cut its way through. The decree of the Convention issued on the 26th May, excluding all Hanoverians as well as English from quarter made this captivity a serious danger, and at Lille the prisoners ran great risk of the guillotine; but a huge National Guard whispered to our hero, *Craignez rien, j'ai été soldat du Roi*, and the escort brought them through to the citadel. They were, however, so poorly cared for that they had to use the stairs and other woodwork of the house for fuel. After peace was declared

he (1796) joined the Army of Observation under the Duke of Brunswick on the line of demarcation, and later the Head Quarter Staff in the capital, and fought a duel, in which he was victor, his second being Gesenius, his friend until his death in 1830.

Times were exceedingly bad for the Hanoverian Army between 1801 and 1803, parsimony resulting in a state of unpreparedness on a par with that of Prussia, and the consequence was that when Napoleon sent Mortier into the electorate it was overrun with ease, and the army surrendered *en masse* in the convention of Lauenburg. Arentschild, a brother of the Hussar of Talavera, was commissioned by the Duke of Cambridge to induce as many as possible of the men to join the English service, and Hartmann in particular on the promise of commanding a company of artillery. He just managed to secure a false passport the day before Captain Bouchard, a Provençal who was quartered on the family and a *ci-devant*, warned his mother that he had instructions to arrest him, and made his way to Hamburg. The German Legion, which was now coming into existence, was a boon to Hanover in this way, that it personified the idea of continuous resistance to the tyranny of Napoleon, and kept the flame of patriotism alive during the dark years which succeeded. Had it done nothing else, its existence would have been fully justified, but it was destined to in no small degree bear the brunt of hard and actual work. It was especially favoured by George III., not particularly to the delight of the English. Scharnhorst had some time before joined the Prussian Service, but his lessons of sobriety, calmness, and healthy life remained and influenced, says the biographer, the conduct of its officers and men, who being moreover set apart in a strange land, found it the easier to keep up their distinguishing good qualities. Hartmann's share in the formation of the artillery in particular and in supplying it with a system of drill was that of the lion. This system was used until the regiment came under the direct orders of the Ordnance Department in 1806.

His first experience of warfare in the new Service was when the Legion as then completed, having 2 horse batteries and 3 field companies, 2 cavalry regiments and 7 battalions of infantry, took part in the abortive expedition to the Elbe in 1805 under Lord Cathcart. The failure was a great blow to the *morat* of the Legion. It next, in 1808, proceeded to Sweden under Sir John Moore, Hartmann now commanding 2 field batteries; but this expedition again was abortive. The force was then diverted to Portugal, where it was landed with very great difficulty in Maceira Bay. In this connection he makes the very pregnant remark, "He little knows the condition of troops after a long sea voyage who thinks he can at once proceed to perform prodigies of valour with them." He had now 3 batteries under him, one being commanded by his old friend Gesenius. Great difficulty was experienced in recruiting the Legion, Hanoverians only being accepted up to 1810, after which all Germans, Swiss, and Poles were taken, but they proved not over satisfactory. He did not share in Sir J. Moore's ill-fated advance, being left in charge of the defences of the Tagus, and afterwards employed surveying the frontier, gaining knowledge which later stood him in good stead. His first opportunity for real distinction came with Talavera, where he commanded the artillery of the left wing. Questa having sent two 12-pounders, the English guns being none of them more than 6-pounders, the officer in charge was quite incapable of working them, but Hartmann, springing from his horse, soon brought them into action, and, after a few shots, was lucky enough to silence one of the enemy's batteries. Later his fire in support of the famous cavalry charge across the ravine called forth the especial praise of Wellington, who clapped the bombardier who directed it on the shoulder, saying, "Very well done, my boy." Brigadier-General Howorth also issued an order thanking the artillery for their services. For this battle he received the gold medal, no one not in command receiving them in those days. One of the most serious dangers at this time was the stubble catching fire, by which the ammunition wagons in particular were constantly endangered. It is curious to note that Wellesley's force of 25,000 men had only 24 guns with it, 12 being German. We next find Hartmann attached to General Hill's wing, commanding the artillery, though only one of his batteries was with it, and having charge of the ammunition columns, though, owing to the scarcity of transport, the artillery had none properly speaking, their supply being replenished as

required by trains of ox-wagons from the depôts on the Tagus and Mondego. It was not long before Hill was called in by Wellington to Busaco, the artillery making 25 leagues in sixty hours under a burning sun and by wretched mountain roads. Their share in the action was slight, but Torres Vedras found Hartmann in great agitation as to the state of the guns, many being taken from ships, even merchantmen, "where they had lain fifty years or more, eaten out with sea-water and not even cleaned. The carriages were worse, and the platforms would not have stood ten rounds."

Next we find him marching with Beresford to Albuera, and a surprise of some of our dragoons at Villa Real and a cavalry combat at Los Sautes, though the latter was a complete success for us, furnish him with food for reflection on the "unreadiness" and want of forethought of the English, and no less the faulty arrangements for the siege of Badajoz. A magazine was obligingly so contrived that the enemy's second shot pitched in it. The long brass 24-pounders from Elvas had shot that weighed scarcely 20 lbs., and had no pretensions whatever to the shape of a cannon ball! In the battle the 2nd Battery of the Legion was so mauled in the famous charge of the Polish lancers that only one of the four guns engaged could be saved. Hartmann hurried to call up the English 9-pounder battery of the 1st Brigade, and with it and the remaining three guns of the Germans, poured a withering fire into the French columns, and helped largely to beat off a fresh charge of French cavalry. Two of the lost guns were recovered, the other, a howitzer, being carried off by the French. Though Hartmann was thanked by Beresford in general orders, his strictures led to a bitter controversy with the Marshal, Napier and the nephew of General Long (of the cavalry) siding with the former. About this time he was engaged in negotiations for inducing his old teacher, Scharnhorst, now a General, to join the English Service, but they ended only in his son, Wilhelm, joining the artillery of the Legion. He took part with Hill in the surprise of Girard at Aroyo.

Howorth, who had commanded the artillery, having political differences with his leader, returned to England early in 1812, and various changes in the command placed Hartmann at the head of the artillery of the 3rd, 4th, and 5th Divisions, with the main army. He had no active share in the siege of Badajoz. He was in the habit of speaking of all the sieges in the Peninsula as butcheries; begun with insufficient means, and those ill-used. After the siege, Dickson and Arentschild, junior majors in the Portuguese artillery, were promoted lieut.-colonels, but not so Hartmann, which so disgusted him that he said openly that, but for his mother's circumstances, he would have resigned. When Wellington advanced towards Salamanca he was with the centre-the 4th and 5th Divisions under Leith. In the rush for the Arapiles, he, with von Sympher's 9-pounder battery, succeeded in occupying the nearest knolls, silencing the light French guns on the further Arapiles, and covering Wellington's change of position.

The English attack on the French Arapiles failed, though the brigade that was defending it had to fall back, and a counter-stroke by a brigade of French cavalry on the exposed flank of the 4th Division caused such a confusion in our left wing that Beresford had to hurry up a brigade of the 5th Division, and this and the fire of the German 9-pounders restored the fight. Hartmann was rewarded with a brevet lieut.-colonelcy, though still only ranking for pay as major of the horse battery of the Legion. This was the first of Wellington's victories with really lasting results. He entered Madrid in the suite of his leader, receiving command of such artillery as remained, and charge of the stores of all kinds at the Retiro, with orders to be able to blow up everything that could not be carried away in case of necessity. A *mot* of Gesenius' on their leader at this time is worth recording: "He wants to be the drum-major of the army." Alben and Hill were constantly calling for supplies, which made his task much heavier. On October 27th, 1812, Wellington, being hard pressed by Sonham, actually sent an order for the destruction of the Retiro, or more properly speaking the Casa de la China, once a porcelain factory, a huge cubical building, the sides of which measured 270 feet, surrounded by a star fort, and having bomb-proof cellars that served as powder magazines. He had arranged the guns in such a way as to burst each

other up and loaded them for the purpose, and three nights later the destruction was pretty effectually carried out. In the retreat on Ciudad Rodrigo a bullet struck him on the chest and he thought himself severely wounded, but on dismounting the bullet fell at his feet, having been turned by a silver case in his pocket. At this time Dickson succeeded to the command of the artillery, and as both he and May were close friends of Hartmann, the slight which was in fact put upon him was forgotten. The artillery now (1813) was increased to 102 pieces, three horse batteries being attached to the cavalry, a 9-pounder battery to each of the nine infantry divisions, while a real artillery reserve was for the time formed, one horse and two field 9-pounder batteries, and an 18-pounder heavy battery (English), and four artillery ammunition columns were formed, having 15 to 20 wagons each. In charge of this reserve Hartmann was now placed. At Vittoria the three lighter batteries and a portion of the horse artillery came under his orders. He records, with the utmost vexation, the skill with which the French took advantage of the accidents of the ground to avoid his fire; as soon as he thought he could effectively cannonade a position, they gave him the slip. It was the first occasion on which Wellington was able to mass guns to any extent. He had so few before that he had to make up for it by heavier metal, and these distributed along his line. The service they rendered, says the biographer, may be judged by its securing Dickson a good service pension of £1 a day, and Hartmann and other staff officers 10s. Graham, to whose corps he was next attached, found small favour in his eyes, as having, so he said, no qualification for a general, but undoubted bravery and a natural shrewdness of judgment. He adds that he never knew when to spare his men, was violent, haughty, and overbearing. He himself had none of the tact which attains its object while seeming to give way. In besieging San Sebastian the general discovered too late that he must first seize the monastery, and tried in vain to set it on fire with 9-pounders, while Hartmann had gone in search of 24-pounders from the ships at Passages, an attempt which, later, greatly amused Wellington. The chief's appearance on the scene reduced Hartmann to commander of the "left attack," the objective being the said monastery; which, being at last set on fire, the garrison managed to escape to the covered way. We may pass over the remainder of the siege, and notice next that his guns covered and made possible the passage of the Bidassoa, and again prepared the attack on the entrenched camp of St. Jean de Luz, abandoned by Soult during the night. At Bayonne he was with the left wing under Hope, and so posted two batteries and some rocket tubes as to speedily drive back a French assault on a small body of our men that had crossed the Adour and could not be reinforced. When the siege in form was commenced, he was placed at the head of the artillery. During the famous sally, Hope, while hastening to the left wing to set matters right, had his horse shot under him, and the horses of his staff bolted, but Macdonald and Hartmann turned and hurried to the assistance of their leader, a very big and burly man, weighed down by the huge horse; but before they could reach him, the French had taken him prisoner, and an English bullet wounded him again on the way to the town. The English piquet was out of reach, or they could still have rescued him. Hartmann was wounded, but not seriously.

The peace was keenly felt by the officers of the Legion, whose occupation was even more completely gone than that of their English comrades, and who had now to renew ties with their native land which had long been practically severed. In 1815 the breach was made wide between them and their old companions in arms by the changed scene of action and the presence of Hanoverian troops as such in the allied army. The feeling of *camaraderie* was especially strong in Hartmann: they were his best years, those from 34 to 40, that he had given to England in the Peninsula. A comrade of those days describes him thus:—"His physique was powerful, his bearing and carriage ideally soldierlike, his dress careful, his complexion brilliant, though the crown of his head was bare and his hair early gray, his eye was bright, and its glance often stern. His temperament was irritable and apt to turn to temporary harshness, though he soon made up for such outbreaks, yet servility made him still more angry. Towards his superiors, especially those of other arms of the Service, he was often brusque.

All nepotism was alien to his nature, impartiality and recognition of others' merits part and parcel of it. He was a perfect master of French and English, and spoke Spanish and Portuguese with fair fluency." If we add to this that he was rather feared and respected than beloved by his inferiors, it becomes superfluous to say that he was devoid of any hankering after false popularity. An English colonel, going to see him years after, put it in this way, "You were often very angry, but you kept us in very good order." He, however, was very deeply affected by the news of his mother's death, which awaited him on his return to England.

He was very soon abroad again, joining, in September, the army under the Prince of Orange, at Brussels. He, of course, commanded the artillery of the Legion, two horse and three field batteries, and soon was entrusted with the charge of that of the Hanoverian contingent as well, and for the present that of the whole allied army. A visit to Hanover soon after showed him what a change the rule of Westphalians had made. On his return he found himself, to his great delight, gazetted K.C.B. It is a trifle amusing to find his son describing this as giving him the style of an English baronet. He was, however, no lover of decorations, and avoided them studiously after this.

He was sent by the Prince to arrange various matters with Wellington, in Vienna, and they travelled a good part of the way to Belgium together when Napoleon's advance was at hand. We find him speaking enthusiastically of a review of some 7,000 English and Legion cavalry, with six horse batteries, near Grammont. At Quatre Bras he did nothing, but at Waterloo he received orders from the Duke at noon to open the ball with Sandham's and Kuhlmann's batteries. They were to the left of and above Hougoumont and were "to fire at the enemy's troops, not his guns." His horse was three times wounded, and two horses killed under his orderly. At six in the afternoon most of the batteries of the first line were back at Mont St. Jean for ammunition and to recruit, and he was sent by Sir George Wood to hurry them back into action, when it was not long before several of them re-appeared on the field. In the general advance he was with Sympher's battery, and was ordered by the Duke to silence some French guns at the farm of Le Caliou. He and his men only got some 1,000 paces in advance of the semaphore, above Neudcrione, when the pursuit was ended.

The Legionaries, when all was settled in France, found they were not to form part of the army of occupation, and received orders to return to Hanover, where they were greeted as the English, and it seemed quite doubtful whether they might not be thrown on the world. The officers were for the time on English half-pay, but Hartmann was very shortly appointed to the new regiment of Hanoverian artillery as colonel commanding one of its two battalions, von der Decken being chief commander. In 1821 he was made President of the Committee for re-organising the artillery. He objected, it appears, to the distribution into regiments and battalions, and insisted that the battery should be the tactical unit. He had also a large share in re-organising the system of military law. He was often urged to become the historian of the Legion, but preferred to contribute on the work of his own arm to the *Military Journal*. He also took up the cudgels for the English Army as against Foy. On the establishment of the Guelphic, Order he was at once made Knight Commander. He was offered the title of Freiherr, but declined it, in secret vexation at the delay in making the offer, begging, however that he might be given a motto commemorative of his services, that of *Treu und fest* being accordingly awarded him. In 1833 he was made Commander of the Artillery Brigade. The return of the Royal Family to Hanover was unfavourable to his interests. The King was good enough to tell him, "Nobody is more self-willed than an artilleryman." But in the main he took his word on military points, and gradually a decided good feeling sprang up between master and man. In 1839 Hartmann celebrated the fiftieth anniversary of his service, and received the Grand Cross of the Guelphic Order. The year before that he was present at the Waterloo dinner, when the Duke himself proposed the health of the Hanoverians. In 1848 he became Commissary-General, an arduous post, as part of the contingent took the field against the Danes. It is perhaps not astonishing that he should have been a thorough-paced re-actionary, but he never

looked on all reform as the dissolution of all the bands of social order. But as he justly says in writing to his son, "a soldier, I feel very strongly, must not concern himself with the internal politics of his own country." In 1850, after nearly 62 years' service, he retired. "Who could find fault with old age," he writes some time later, "if he were so happy in his family as I am?" Two years later he was promoted General, and in 1856, a very few weeks before his death, he and his family were quite unexpectedly ennobled. On May 27th of that year, while mounting the steps of the palace to pay his respects to his royal master, a violent spasm of the chest seized him and he was taken home unconscious. He rallied, and was making ready to leave Hanover for rest and a course of waters, when a fresh attack, early in the morning of the 7th July, brought on apoplexy, and after a brief struggle he expired in the arms of his wife. It was the fortunate ending to a prosperous life, the true "euthanasia" of a "happy warrior."

The Diary of a Dug-Out; or, The Experiences of a Reserve Officer. By Captain BASTIEN KING. London. Sands & Co. 1s.

This book is evidently the work of a soured and discontented man, abnormally touchy, and only too ready to find fault and grumble with or without provocation. The "Dug-Out" is a Reserve Officer, recalled to active service at the commencement of the recent emergency, and commences by being exceedingly annoyed and aggrieved that he is ordered, and not politely invited, to return to the Army. The whole of his subsequent service is devoted to fault-finding. He is not merely dissatisfied himself, but endeavours to sow discontent amongst junior officers. Some of his criticisms are no doubt justified, but they are conceived in such an obviously biased and hostile spirit that they lose all value. That the obligatory expenses of officers' messes, for instance, are excessive, is certainly correct, but that is no reason for urging the abolition of these institutions, which undoubtedly do much to foster *esprit de corps*, and which are the admiration and envy of Continental Armies. With the author's opinion that our Army is over-officered, few will be found to agree. No doubt there is much room for improvement and alteration in Army matters, but the whole question should be approached in a liberal, broad-minded spirit, and not in one of unconcealed hostility to every institution connected with that Service. The author remarks, "Yes, an officer is easy enough to get, but a private soldier is not. Whether the officer is of the right stamp is quite another matter." Captain Bastien King, as he calls himself, is very evidently not of the right stamp, and it is to be hoped that there are but very few like him remaining in it.

PRINCIPAL ADDITIONS TO LIBRARY DURING NOVEMBER, 1901.

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La Guerre de 1870-71 rédigée à la Section Historique de l'Etat. Published by the French General Staff. 5 vols. 8vo. Paris, 1901.

In the Ranks of the C.I.V. By ERSKINE CHILDERS. Crown 8vo. London, 1901.

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Impressions of a Doctor in Khâki. By F. E. FREMANTLE. 10s. 6d. 8vo. London, 1901.

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D'Alger au Congo par le Tchad. By F. FOURREAU. 8vo. Paris, 1902.

Organisation and Equipment made Easy. By Major S. T. BANNING. 4s. 6d. 2nd Edition. 8vo. Aldershot, 1901.

The Army Diary and Pocket-Book for 1902. By T. M. B. 1s. Demy 12mo. Aldershot, 1901.

Unofficial Despatches. By EDGAR WALLACE. 8vo. London, 1901.